Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON, Editor-in-Chief

MERRITT LYNDON FERNALD
HOLLIS WEBSTER
CARROLL WILLIAM DODGE } Associate Editors

WILLIAM PENN RICH, Publication Committee

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Vol. 29. January, 1927. No. 337.

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THE FLOWER OF CHIMAPHILA.

Theo. Holm.

(Plate 156.)

The *Pyrolaceae, Pyrola* as well as *Moneses* and *Chimaphila,* were well known to the older botanists, and described under the name *Pyrola.* Brunfels (1532) knew *Pyrola rotundifolia;* Clusius (1576), *P. secunda, Moneses* and *Chimaphila umbellata;* Plukenet (1696), *Chimaphila maculata;* Haller (1740), *P. minor, etc.* Fuchs (1549), however, used the name *Limonium,* but his figure leaves no doubt of being intended for some species of *Pyrola.* Some few other genera were also called *Pyrola,* among them *Trientalis* and *Cornus canadensis* (Bauhin), *Parnassia* (Morrison), *Epigaea* (Plukenet), and *Goodyera* (Loeselius).

Since then the genus has been divided by Pursh, who segregated *Chimaphila,* and by Salisbury, the author of *Moneses.* On the other hand, *Amelia* and *Thelaia* Alefeld,[1] and *Actinocyclus* Klotzsch are considered only as subgenera of *Pyrola* in the works of Bentham, Hooker, Gray, Engler and Prantl and several others. Though Pursh established *Chimaphila,* Michaux had already called attention to the pronounced difference in habit and floral structure, when comparing *Pyrola umbellata* and *P. maculata* with the other species.[2]

A few years after Pursh, Nuttall redescribed *Chimaphila,* mentioning the actual presence of a style "very short, immersed in the germ," besides "germ surrounded at the base by a glandular ring." This is

[1] For references consult the bibliography appended.

[2] The classification, proposed by Elias Fries (1840), according to which *Moneses* should represent a species of *Chimaphila,* namely *Ch. uniflora* Fr., has not been adopted except by Lange (l. c., p. 427).

the earliest record of a nectary in the *Pyrolaceae*, and with regard to *Hypopithys* and *Monotropa*, Nuttall described also the segments of the corolla as having "a cucullate nectariferous base," and the development of "ten very short recurved filiform appendices alternating with the stamens."

In Europe the *Pyrolaceae* were described and several figured by Radius (1821), who was familiar with the works of Pursh and Nuttall, but without making any mention of the nectary in *Chimaphila*. On the other hand, Alefeld (1856), in his comprehensive treatment of the *Pyrolaceae*, called attention to *Pyrola secunda*, in which he observed: "ovarium basi nectariis 10, compressis, acutis, triangularibus, copiose mel secernentibus, filamentis alternantibus, valliculis fundo petalorum oppositis." This author described *Moneses* as having "ovarium nectariis destitutum," but said nothing about *Chimaphila*, evidently not knowing the work of Nuttall. Meanwhile Irmisch, who studied the *Pyrolaceae* so very carefully from a morphological and biological viewpoint, succeeded in finding a discus or nectarium in *Chimaphila umbellata*, independently of Nuttall, whose work he would have cited, if he had read it.

Finally, according to Drude, a 10-dentate nectar-secreting discus occurs in *Moneses*. But no further discoveries have been recorded of nectaries in the other species. Bentham and Hooker mention the nectaries very briefly "10-crenatus" in *Pyrola secunda*, "obscurus" in *Moneses*, and "inconspicuus" in *Chimaphila*, and Gray (Synopt. Flora) mentions the disk as "obsolete or obscure" in *Pyrolineae*, except in *Pyrola secunda*, where the "hypogynous disk" is described as "10-lobed."

Very few authors have given much attention to this structure. Torrey, however, observed the disk in *Chimaphila* to be glandular, and Blytt, in his Flora of Norway, recorded the facts brought out by Alefeld and Irmisch. In describing the floral diagram of the *Pyrolaceae*, Eichler cites the observations of Irmisch and Alefeld, while Sachs gives a figure of the nectar-glands in *Chimaphila*. Conversely, in the more recently published work by Warming, "Spermatofyter" (1912), the *Pyrolaceae* (*Pyrola*, *Moneses*, and *Chimaphila*) are said to be destitute of honey, while nectariferous glands are attributed to *Monotropa*. Finally, in the North American Flora, Rydberg mentions only the nectaries in *Pyrola secunda*. Thus, considered altogether, the accounts of these structures are anything but complete,

and it seems strange that the observations made by Nuttall, Alefeld, Irmisch, and Drude have been so frequently overlooked.

With regard to the pollination of the flower in *Chimaphila,* we have not been able to find any reference to the matter in literature. Hermann Mueller has described the process in *Moneses* and some few species of *Pyrola,* and Warming in *P. grandiflora.* Sprengel described it in *Monotropa,* but neither in *Pyrola* nor *Chimaphila.* We might state at once that Mueller considered self-pollination to be excluded from *Moneses* on account of the mutual position of the stamens and stigma, but with the admission that he failed to observe any insects in the flowers. In *Pyrola minor,* on the other hand, this author did finally succeed in observing visitors, some beetles and flies. According to Warming, spontaneous self-pollination seems possible in *Pyrola rotundifolia,* and especially so in *P. grandiflora.* By these authors the pollen-tetrads are described as glabrous and readily falling out of the anthers.

In *Chimaphila umbellata* and *Ch. maculata* the flowers are fragrant, notably in the latter, and we observed a secretion of nectar in the form of minute drops (mostly ten at the same time) from the discus, thus corroborating the statements of Irmisch. The flowers are very conspicuous by their color, pink in *Chimaphila umbellata,* creamy white in the other species, with the anthers deep rose to purplish in the former, yellowish brown in the latter. These facts, in connection with the fragrance, induced us to believe that pollination by insects would be most natural. Nevertheless, we failed to observe a single case out of several hundreds where insects were actually present. Probably the pollinators are nocturnal insects.

The flowers, even as buds, are pendulous in both species and perfectly polypetalous. They remain pendulous in *Chimaphila umbellata* for some time after pollination, while in the other species the peduncle often becomes erect, holding the flowers in a position fully exposed to lateral light. The ten stamens have their filaments widened considerably and thickened, ciliate in *Chimaphila umbellata* (figs. 4–6), densely hairy along the margins and all over the lower face in *Ch. maculata* (figs. 9–11). In both species the anthers are extrorse in the bud, with the pores in the lower portion, but become inverted at a later period, thus placing the pores at the top. Besides that, the two halves of the anther are widely separated from each other and conspicuously 2-horned, with each pore placed at the end of its own

tube (figs. 4, 9, and 14). The pollen-grains are united into tetrads, which are viscid and fall out in small clumps, while in the other *Pyrolaceae* the pollen is dry and very light. Viscid pollen is known from some of the *Rhodoraceae.* The style is partly immersed in the depressed summit of the globular ovary (fig. 13); the stigma is broad, orbicular, and disc-shaped, with the margin 5-crenate. The ovary (fig. 12) is not smooth, but shows five linear ridges alternating with five bifurcate, and is surrounded at the base by a cup-shaped disc, pale green, with the margin entire, and secreting nectar (figs. 7, 12 and 13).

The flowers are protogynous. Before they open, the stigma is free and very viscid (fig. 1), while the anthers are not yet ready to shed the pollen (fig. 12). For even if the pores are open at a very young stage of the flower, some time is required before the anthers turn over and shed the pollen. When the flower opens, the anthers are held in a horizontal position with the pores in the periphery (fig. 2). In *Chimaphila umbellata* they become vertical after pollination (fig. 3); in *Ch. maculata*, they are almost vertical in the flower just opened, becoming more spreading, almost horizontally, after pollination (fig. 8). At the time of pollination the anthers have thus turned over with the pores pointing more or less towards the stigma, but owing to the position of the stigma, the pollen can hardly reach its viscid surface, unless by means of visiting insects. Moreover, the pollen is not shed so very readily; some movement is necessary before the sticky pollen-masses can come out. It would thus appear as if the pollination must be effected by means of insects which, attracted by the odor, visit the flowers and, in sucking the honey, necessarily touch the anthers. The movement of the anthers will cause the heavy, viscid pollen to fall out, and, covered with pollen, the insects may transfer it to another flower; thus cross-pollination becomes established. Fruiting specimens of both species of *Chimaphila* are abundant every year, and the number of seeds is immense. Nevertheless, seedlings of these species, or plants developed from seeds, are extremely seldom found. This may be on account of the great difficulty in striking the proper conditions, soil especially, for the germination of the seeds. The generally social occurrence and the very wide geographic distribution of the *Pyrolaceae* depends upon their power to spread by means of stolons, as well as by root-shoots.

Nuttall was the first author to point out the affinity of *Monotropa* to *Pyrola,* and by Warming (1912) this classification has been accepted.

Thus the family *Pyrolaceae* includes *Monotropa* and its allied genera, *Pterospora,* etc. Some few points in the family diagnosis as written by Warming (op. cit., p. 350) are not exactly correct. The anthers are not awnless in all these plants; they are 2-awned in *Pterospora.* The flowers are not always destitute of nectaries; such occur in *Chimaphila, Moneses,* and *Pyrola secunda.* Finally, *Pyrola aphylla* is neither leafless nor poor in chlorophyll.

Clinton, Maryland.

Explanation of Plate 156.

Chimaphila umbellata. Fig. 1, flower-bud, showing the stigma perfectly free, × 3. Fig. 2, flower just opened, the anthers kept in a horizontal position, × 3. Fig. 3, a mature flower, showing the anthers in a vertical position, × 3. Figs. 4 and 5, stamens of same flower drawn in fig. 3, × 6. Fig. 6, a stamen, dorsal face, from the bud drawn in fig. 1, × 6. Fig. 7, base of the ovary of a mature flower, showing the disk (white in the figure); stamens, petals, and sepals removed; × 6.

Chimaphila maculata. Fig. 8, a mature flower; anthers held in a horizontal position; × 3. Figs. 9, 10, and 11, three stamens of same flower, ventral, dorsal, and side view, × 6. Fig. 12, a flower-bud, showing the pistil with the disk (D) at the base and one stamen; the other parts removed; × 6. Fig. 13, longitudinal section of same pistil; D = the disk; × 6. Fig. 14, part of anther, showing the 2-lobed pore.

Bibliography.

Alefeld, F. Ueber die Familie der Pyrolaceen. Linnaea *28,* 1856, pp. 21, 71, 78, and 81.

Blytt, M. N. Norges Flora, vol. 1. Christiana, 1861, p. 848.

Eichler, A. W. Blüthen-Diagramme. Leipzig, 1875, p. 343.

Engler and Prantl. Natürliche Pflanzenfamilien, IV, pt. 1. Leipzig, 1897, p. 8 (Pyrolaceae by Drude).

Gray, A. Synoptical Flora of North America, 2nd ed., vol. 2, pt. 1. New York, 1886, pp. 17 and 46.

Irmisch, Thilo. Einige Bermerkungen über die einheimischen Pyrola-Arten. Bot. Zeit. *14,* 1856, p. 585.

Same. Kurze Mittheilung über einige Pyrolaceen. Flora *42,* 1859, p. 497.

Klotzsch, I. F. Studien über die natürliche Klasse Bicornes L. Linnaea *24,* 1851, p. 3.

Lange, Joh. Haandbog i den Danske Flora, 4th ed. Kjøbenhavn, 1886–1888, p. 426.

Mueller, Hermann. Alpenblumen, ihre Befruchtung durch Insekten. Leipzig, 1881, p. 375.

Nuttall, Th. The Genera of North American Plants, vol. 1. Philadelphia, 1818, p. 275.

Pursh, Fr. Flora Americae Septentrionalis, 2nd ed., vol. 1, London, 1816, p. 300.

Radius, Justus. Dissertatio de Pyrola et Chimaphila. Leipzig, 1831.

Sachs, J. Lehrbuch der Botanik, 4th ed. Leipzig, 1874, p. 544.

Sprengel, C. K. Das entdeckte Geheimniss der Natur. Berlin, 1793, p. 238.

Torrey, John. A Flora of the State of New York, vol. 1. Albany 1843, p. 455.

Warming, Eug. Biologiske Optegnelser om Grønlandske Planter. Bot. Tidsskr. *15*, 1886, p. 165.

Same. Froeplanterne (Spermatofyter). Kjøbenhavn, 1912, p. 350.

CLINTON, MARYLAND.

FURTHER LIGHT ON OUR PURPLE-FLOWERED EUPATORIUMS.

KENNETH K. MACKENZIE.

LAST year Dr. S. F. Blake on his visit to England at my request kindly examined and made photographs of and notes on some of the specimens of North American purple-flowered Eupatoriums preserved in some of the old herbaria there. American botanists are certainly under obligation to Dr. Blake for the care he gave to this matter. This information and other information which has come to hand have thrown much additional light on the problem of the proper identification of these plants heretofore discussed by Prof. K. M. Wiegand and myself in RHODORA (**22**: 57 and **22**: 157). The facts to be added to the discussion may be grouped under the different species as follows:

EUPATORIUM TRIFOLIATUM

Dr. Blake's notes are as follows: "Clayton 620, Brit. Mus.—Leaves lanceolate, cuneate into petiole, thin, penninerved, beneath gland-dotted and along veins sordid-pilosulous; stems essentially glabrous

(but inflorescence sordid-pilosulous), not evidently glaucous, purple at nodes, not speckled, pithy and solid!; inflorescence convex. (No specimen of this species in Linn. Herb.)"

The photograph is of the upper part of a spindling plant. As noted by Prof. Wiegand "the specimen seems abnormal," but specimens exactly answering it are quickly found wherever the species is at all abundant. However, it is easily understandable how it was misunderstood in the absence of notes. The statement made concerning this species that "as far as can be made out from the print, the stem is purple and glaucous and not darker at the nodes. The stem is also cracked in one place in a manner more likely to occur if it were hollow" is now to be contrasted with the facts as given by Dr. Blake and quoted above.

It is very evident from both the description and specimen of *Eupatorium trifoliatum* that it is the plant treated both by Prof. Wiegand and myself as species No. 4.

Eupatorium maculatum.

The Amoenitates Academicae of Linnaeus are devoted almost entirely to the dissertations of his pupils. However, all of these dissertations had previously been published as separate pamphlets. It has come to be realized, therefore, that references should properly be made to the original dissertations and not to the Amoenitates. These original dissertations were issued under the names of the various pupils of Linnaeus, and in the absence of a direct statement that the work was the work of Linnaeus, it seems to me that the ordinary rule should be followed and the species described in these dissertations should be credited to their respective authors and not to Linnaeus.

It has been supposed that when Linnaeus came to republish these species in the Amoenitates, he merely copied the original dissertations with the exception of some preliminary matter. As a general rule, he did this, but not infrequently he made changes, sometimes of an extremely radical nature. The result is that it is never safe to rely on the Amoenitates. The original dissertations must always be consulted. Unfortunately, these original dissertations are scarce. There are 186 of them in all, botanical and non-botanical, and my information is that a complete set does not exist in the United States.

In discussing *Eupatorium maculatum* both Prof. Wiegand and I relied entirely on the description appearing in the Amoenitates and

this description I quoted in Rhodora (**22**: 161). The true original description, however, is as follows:

"77. EUPATORIUM (*maculatum*) foliis quinis, lanceolatis, aequaliter serratis, petiolatis, venosis.

"*Descr. Folia* quinque ad genicula, lanceolata, aequaliter serrata. *Caulis* tenuissime maculatus. Varietas *Eupatorii purpurei* ad hoc, ut & ejus synonyma & descriptio spectant. Eupatorium enim *purpureum* foliis quaternis, lanceolato-ovatis, inaequaliter serratis, rugosis est."

Juslenius, Centuria I. Plantarum 27. 1755.

It will be noted that Juslenius did not refer to any particular collection, but merely gave a general description, although in this dissertation when he was basing new species on collections by Kalm, Loefling or Hasselquist, he cited these collections.

The description previously copied by me from the Amoenitates (Rhodora **22**: 161) was given as published by Linnaeus in 1759. To the original description it will be noted he (1) added all the citations and the habitat; (2) added the word "tomentosis" in the first line; and (3) added the words "vel sex" in the middle of the phrase "folia quinque ad genicula."

On the basis of a specimen in the Linnaean herbarium, Prof. Wiegand identified this species. A photograph of this specimen has now been furnished me by Dr. Blake. It shows a specimen having two whorls of six leaves each. It therefore was not the specimen on which the original description of *Eupatorium maculatum* was based as was assumed (l.c. 59), because that description called only for a plant having five leaves at each node.

This specimen may well have been before Linnaeus when he enlarged the description of the species, although it is equally possible that his enlarged description was merely taken from previous authors. Therefore, I will quote Dr. Blake's description of the specimen: "One sheet, K(alm), in Linn. Herb. Leaves oblong or ovate oblong, feather veined, simply crenate-serrate, thickish (more veiny and thicker than the two sheets of *E. purpureum*), acuminate, cuneate at base, pilose beneath with many-celled hairs, blade to 12 × 4.5–5 cm., petiole 1–1.2 cm.; stem purplish (probably once glaucescent ?) with very few linear spots, glabrous below last whorl of large leaves; peduncle and convex inflorescence densely sordid-pilosulous with lax many-celled hairs; involucre 7.5 mm. high, purplish-tinged; corollas 6 mm. long, pale purplish-tinged, exserted about 3 mm."

The photograph shows a plant with strongly convex inflorescence. It is not the northern species with flat-topped inflorescence with which it was identified by Prof. Wiegand, but is the species described by Juslenius. It is readily placed in Wiegand's Species No. 3 by the use of his key in RHODORA (**22**: 62).

The original description of *Eupatorium maculatum* was certainly very plain. Linnaeus afterwards added citations, all of which were incorrect (RHODORA **22**: 162). These must of course be disregarded and the name applied to the plant to which the description applies, the Species No. 3 of Prof. Wiegand's and my treatments. It may be added that the only plants cited by or known to Linnaeus with leaves in whorls of more than four belonged to this species.

EUPATORIUM PURPUREUM.

When in 1755 Juslenius removed from the aggregate *Eupatorium purpureum* his *Eupatorium maculatum* with leaves in whorls of five, he left in it species with leaves in whorls of four. Specimens with leaves in whorls of six were not provided for, but later Linnaeus took them out also and added them to *Eupatorium maculatum*. What was left in *Eupatorium purpureum* consisted in small part of what Prof. Wiegand treated as Species No. 2 and in large part of his Species No. 1. The Linnaean description applies to Species No. 1. The work of Juslenius in keeping the Linnaean name for the plant to which the Linnaean description applied was excellent. That is the plant treated by Prof. Wiegand as *Eupatorium verticillatum* Lam., and that is the plant which should be called *Eupatorium purpureum*.

In conclusion it is proper to emphasize again the point that the idea prevalent in certain quarters that these old species should be identified by specimens in the old herbaria without reference to descriptions or citations is most incorrect and mischievous. The Linnaean herbarium especially is full of specimens incorrectly labeled, often by Linnaeus himself I believe. In dealing with *Iris*, Dyckes (the Genus Iris p. 6) says "very nearly half of the Linnaean specimens appear to be wrongly named." Gray (Proc. Am. Acad. **17**: 177–178) shows the mixtures in *Solidago*. I myself went over the sheets of *Carex* and found that the errors were numerous. The specimens when they agree with descriptions are often very helpful, but the names should be applied in accordance with descriptions given and not according to specimens of whose history nothing is known.

MAPLEWOOD, NEW JERSEY.

MUHLENBERGIA UNIFLORA.

M. L. Fernald.

Muhlenbergia **uniflora** (Muhl.), n. comb. *Poa ? uniflora* Muhl. Descr. Gram. 151 (1817). *Agrostis serotina* Torr. Fl. U. S. i. 88 (1824). *Vilfa serotina* Torr. in Gray, Gram. et Cyp. i. no. 2 (1834). *V. tenera* Trin. Mém. Acad. St. Pétersb. Sér. 6, vi. 87 (1840). *Poa modesta* Tuckerm. Am. Journ. Sci. xlv. 45 (1843). *Sporobolus serotinus* (Torr.) Gray, Man. 577 (1848). *S. uniflorus* (Muhl.) Scribn. & Merr. U. S. Div. Agrost. Circ. 27: 5 (1900).

Muhlenbergia uniflora is the delicate grass of northeastern America which long passed as *Sporobolus serotinus* and which has recently been called *S. uniflorus*. It is a most definite *species* but, as indicated above and as will appear in the discussion, its generic and even its tribal affinity have both been open to varying interpretations, the species passing at different times as a member of *Poa* and of *Eragrostis* of the *Festuceae* and at other times as a species either of *Agrostis*, *Vilfa* or *Sporobolus* of the *Agrostideae;* and now, rightly as it seems to me, it finds a place in *Muhlenbergia* of the latter tribe. *Sporobolus*, as the generic name clearly indicates, is the genus of the *Agrostideae* with grains free at maturity, as in *Eragrostis* of the *Festuceae*. Not only are its grains free (whence the English "Drop-seed Grass") but the lemmas or flowering glumes are delicately membranaceous and often colorless. The plant which has been passing as *Sporobolus uniflorus* is emphatically not a "Drop-seed Grass;" its mature grains, gathered in October when the spikelets are quite ripe, are firmly embraced by the lemma and palea and much mechanical force is required to free them; in other words, the fruit is that of *Muhlenbergia*. Furtheremore, the firm green to metallic-purple 3–5-nerved lemmas remove the species from *Sporobolus* and place it in *Muhlenbergia*.

On the American continent *Muhlenbergia uniflora* has a diffuse panicle but in the Newfoundland variety, later to be discussed, the panicles are usually contracted and slender, closely simulating those of *M. Richardsonis* (Trin.) Rydb. and its allies which Rydberg[1] has rightly removed from *Sporobolus*. In fact, the habit of *M. uniflora*, of becoming perennial by proliferation from the lower axils of the old culms, is so like that of *M. Richardsonis* (*Sporobolus Richardsonis* Merr.), that the extreme plant of Newfoundland is quickly separated from *M. Richardsonis* only by its smaller spikelets and blunter lemmas.

[1] Rydberg, Bull. Torr. Bot. Cl., xxiii, 599–601 (1905).

When well developed, *Muhlenbergia uniflora* has diffuse panicles with freely forking capillary branches and with the capillary pedicels mostly 2–6 times as long as the spikelets. In Newfoundland, however, as already noted, it tends to have a strongly contracted panicle, with erect only slightly forking branches; but occasional colonies with spreading branches are found. The extreme Newfoundland plants have panicles only 0.2–1 cm. in diameter, but the exceptionally large panicles reach a diameter of 3 cm. In all Newfoundland specimens (and a few from Nova Scotia) the pedicels are short, many of them less than twice the length of the spikelets. But the most interesting point shown by many of the Newfoundland plants is the tendency of the terminal spikelets to be 2-flowered, with the lower flower perfect, the upper pistillate. Not all the plants exhibit this character but of 11 numbers before me 6 show some of the terminal spikelets 2-flowered, some panicles with only 1 or 2 such spikelets, others with varying numbers up to 35. Departing in three tendencies from the continental type and clearly connecting with it in Nova Scotia, the Newfoundland plant is most satisfactorily treated as a geographic variety, the two extremes very distinct but not fully differentiated from each other since the segregation of the Newfoundland and the continental areas by the submergence of the continental shelf. It is proposed as

Muhlenbergia uniflora, var. **terrae-novae**, n. var., a forma typica recedit paniculis plerumque contractis 1.2–8 cm. longis 0.2–1 cm. diametro (rare diffusis deinde 3 cm. diametro), ramulis plerumque coarctatis; pedicellis lateralibus plerumque 1–2 mm. longis; spiculis superioribus saepe bifloris, flore superiore femineo.—Newfoundland. The following are thoroughly characteristic: moss and silicious rocks along rill, slope of South Hill, St. John's, August 14, 1924, *Fernald, Long & Dunbar*, no. 26,244 (type in Gray Herb.); wet mossy and turfy slopes of sandstone and arenaceous slate hills back of Carbonear, August 6 and 7, 1911, *Fernald & Wiegand*, no. 4539; peaty or muddy borders of ponds, Grand Falls, August 14, 1911, *Fernald, Wiegand & Darlington*, no. 4540; wet sandy shore of Rushy Pond, August 28, 1911, *Fernald, Wiegand & Darlington*, no. 4541; open peat bogs back of Birchy Cove (Curling), August 10, 1910, *Fernald, Wiegand & Kittredge*, no. 2504; seepy runs in bog-barrens among the gneiss hills back of Port aux Basques, August 31, 1924, *Fernald, Long & Dunbar*, no. 26,243. The following display no 2-flowered spikelets but are otherwise characteristic: swamps near confluence of Exploits River and Badger Brook, August 13, 1894, *Robinson & Schrenk;* bogs, Bishop Falls, July 28 and 29, 1911, *Fernald, Wiegand & Darlington*, no. 4538; boggy shores of small ponds, Birchy Cove (Curling),

August 11, 1910, *Fernald, Wiegand & Kittredge*, no. 2503; depressions in sphagnous marsh, Lark Harbor, August 31, 1926, *Fernald, Long & Fogg*, no. 100; bare depressions in wet peat on gneiss hills along Grandy Brook, September 11, 1926, *Fernald, Long & Fogg*, no. 101.

The occurrence of 2-flowered spikelets is not restricted to the Newfoundland plant, though it is there more general than on the continent. Throughout the range of typical *Muhlenbergia uniflora* plants with 2-flowered spiklets occur. Thus, the typical continental plant is represented in the Gray Herbarium and the herbarium of the New England Botanical Club by 160 numbers; and of these, 27 numbers (17% of the whole) show 2-flowered spikelets: plants from Nova Scotia, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey and Michigan. In most specimens such spikelets are few (1 to 3 or 4) but in some collections they are so abundant as to give the plant a resemblance to *Eragrostis capillaris* (L.) Nees. *M. uniflora* was originally described by Muhlenberg as perhaps a Poa, *Poa? uniflora*, which he thought might be a variety of *Poa capillaris* L., now universally called *Eragrostis capillaris* ("Habitus *P. capillaris*, cujus forsan varietas"—Muhlenberg); and the late William Boott, certainly an acute botanist, collecting material with 2-flowered spikelets at Fresh Pond, Middlesex Co., Massachusetts, and Thoreau, getting a similar plant near Concord, each labeled it without question as *Eragrostis capillaris!* Furthermore, Edward Tuckerman, familiar with the Fresh Pond plant with 2-flowered spikelets, described it as *Poa modesta* "spiculis . . . bifloris," identifying with it Muhlenberg's *P. ? uniflora* but changing the seemingly inappropriate name because "it seems almost certain that it [Muhlenberg's plant] was a branch of this Poa, from which part of the florets had fallen off;" and John Carey, commenting, in the Gray Herbarium, on material called *Poa modesta* from New Hampshire, wrote: "I do not see why these may not be reduced northern forms of *Eragrostis capillaris*." [1]

It is, likewise, significant that, although the treatment given by Hitchcock in the 7th edition of Gray's *Manual* eliminates conspicuous

[1] In view of the obvious difficulty of quickly distinguishing young plants of *Muhlenbergia uniflora* with 2-flowered spikelets from small plants of *Eragrostis capillaris*, the following statement of contrasts may prove useful.

ERAGROSTIS CAPILLARIS. Tufted annual, with ciliate leaf-sheaths; spikelets 2–several-flowered; glumes attenuate; upper lemma (when spikelet only 2-flowered) distinctly overtopping the lower; *mature grain free* from the lemma and palea.

MUHLENBERGIA UNIFLORA. Perennial by proliferation from the lower axils of old culms; leaf-sheaths glabrous; spikelets 1–2-flowered; glumes blunt or merely acutish; upper lemma (when spikelets 2-flowered) barely exceeding the lower; *mature grain closely embraced* by the lemma and palea.

mention of 2-flowered spikelets in *Sporobolus* and *Muhlenbergia* (merely giving a note under *S. compressus*, "Spikelets rarely 2-flowered"), all six preceding editions, beginning with Gray's own in 1848 and running through the Watson & Coulter edition of 1889, consistently defined the genus *Sporobolus* with "Spikelets 1- (rarely 2-) flowered" and placed *S. compressus* (*S. Torreyanus*) and *S. serotinus* (now *Muhlenbergia uniflora*) in a section with "*spikelets not unfrequently 2-flowered.*" Bentham & Hooker, also, in their synopsis of genera under the tribe *Agrostideae*, add "Excepta: Spiculae interdum 2-florae in speciebus 2 Sporoboli;" [1] and in their fuller discussion designated the two species emphasized by Gray. And Nash went still further, in his description of *Sporobolus* saying "occasionally 2–3-flowered." [2]

It should be sufficiently clear from these notes that *Muhlenbergia uniflora* is a species of unusual interest. Ordinarily it is a perfectly good *Muhlenbergia*, with 1-flowered spikelets, but occasionally it develops a few spikelets which are at variance with the general character of *Muhlenbergia* and the tribal character of the *Agrostideae* in having 2 flowers; and when these spikelets become numerous, as in the plant which Tuckerman described as *Poa modesta* and which Carey, William Boott and Thoreau independently identified with *Eragrostis capillaris*, the line between the tribes *Festuceae* and *Agrostideae* indeed becomes obscure. Not only do *Muhlenbergia uniflora* and *Sporobolus compressus*[3] show this breakdown of a traditional tribal character, but it is easy to find in some other species—*S. confusus* Vasey and *S. asperifolius* (Nees & Meyen) Thurb., for example—a few 2-flowered spikelets; and as early as 1843 Torrey described his *Muhlenbergia ambigua* as "1–2-flowered . . . superior floret often perfect, and maturing its fruit;" [4] while Scribner states that "The presence of a more or less developed second floret, noted in the original diagnosis of *M. ambigua*, occurs in other species of this group" [5] The development of occasional 2-flowered spikelets in *Agrostis* (for instance, *A. borealis* Hartm. from Newfoundland, *Wiegand, Gilbert & Hotchkiss*, no. 26,476) further indicates that search may show such spikelets to occur ex-

[1] Benth. & Hook. Gen. Pl., iii, 1084 (1880).

[2] Nash in Britton & Britton, Ill. Fl., i. 150 (1896).

[3] I have seen no good fruit of this species and am, therefore, not prepared to say whether it is a true *Sporobolus*.

[4] Torr. in Nicollet's Rep. 164 [237] (1843).

[5] Scribner, Rhodora, ix. 20 (1907).

ceptionally in other genera of the *Agrostideae*. Their exceptional occurrence is presumably a reversionary tendency in which the comparatively advanced *Agrostideae* hark back to the more primitive *Festuceae;* at least, such an interpretation is in accord with the views of the relative advancement of the two tribes put forward in 1911 by the late C. E. Bessey[1] in an outline which has been adopted with only slight modification by Hitchcock[2] in this country and by Wettstein[3] in Europe.

Gray Herbarium.

NOTES ON THE FLORA OF BOOTHBAY, MAINE—II.

Norman C. Fassett.

Montia lamprosperma Cham. This species was found on a salt-marsh at Ocean Point, confined to a spot where a brush pile had been burned the previous year. Hitherto unknown southwest of Penobscot Bay.

Euphrasia purpurea Reeks, var. Randii (Robinson) Fernald & Wiegand. Very abundant at the edge of the turf on the summit of sea-cliffs, White Island. An extension of range southwestward.

Plantago juncoides Lam., var. glauca (Hornem.) Fernald. Exposed sea-cliffs, White Island.

Plantago oliganthos R. & S., var. fallax Fernald. Salt marsh, Ocean Point. An extension southwestward from the station at Great Cranberry Island.[4] A study in the field of our two maritime species of *Plantago* confirmed the statements of Professor Fernald regarding their ecology. On the rocks and sea-cliffs *P. juncoides* and its variety *glauca* were consistently found, while material collected on the salt-marshes was always *P. oliganthos* and its variety *fallax.*

Department of Botany, University of Wisconsin.

[1] "There are six tribes and several sub-tribes, of which the Bamboos are the lowest, while the Agrostideae, Paniceae and Maydeae are at the summits of as many diverging phyletic lines"—Bessey, Outlines of Plant Phyla, ed. 2: 14 (1911). Bessey's arrangement may have been published in the first edition, which I have not seen.

[2] "The tribes have been arranged in a new sequence based on the complexity of the flower structure."—Hitchcock, Gen. Grasses U. S. 2 (1920).

[3] Wettstein, Handb. Syst. Bot. Aufl. 3: 895–902 (1924).

[4] Rhodora xxvii. 93–104 (1925).

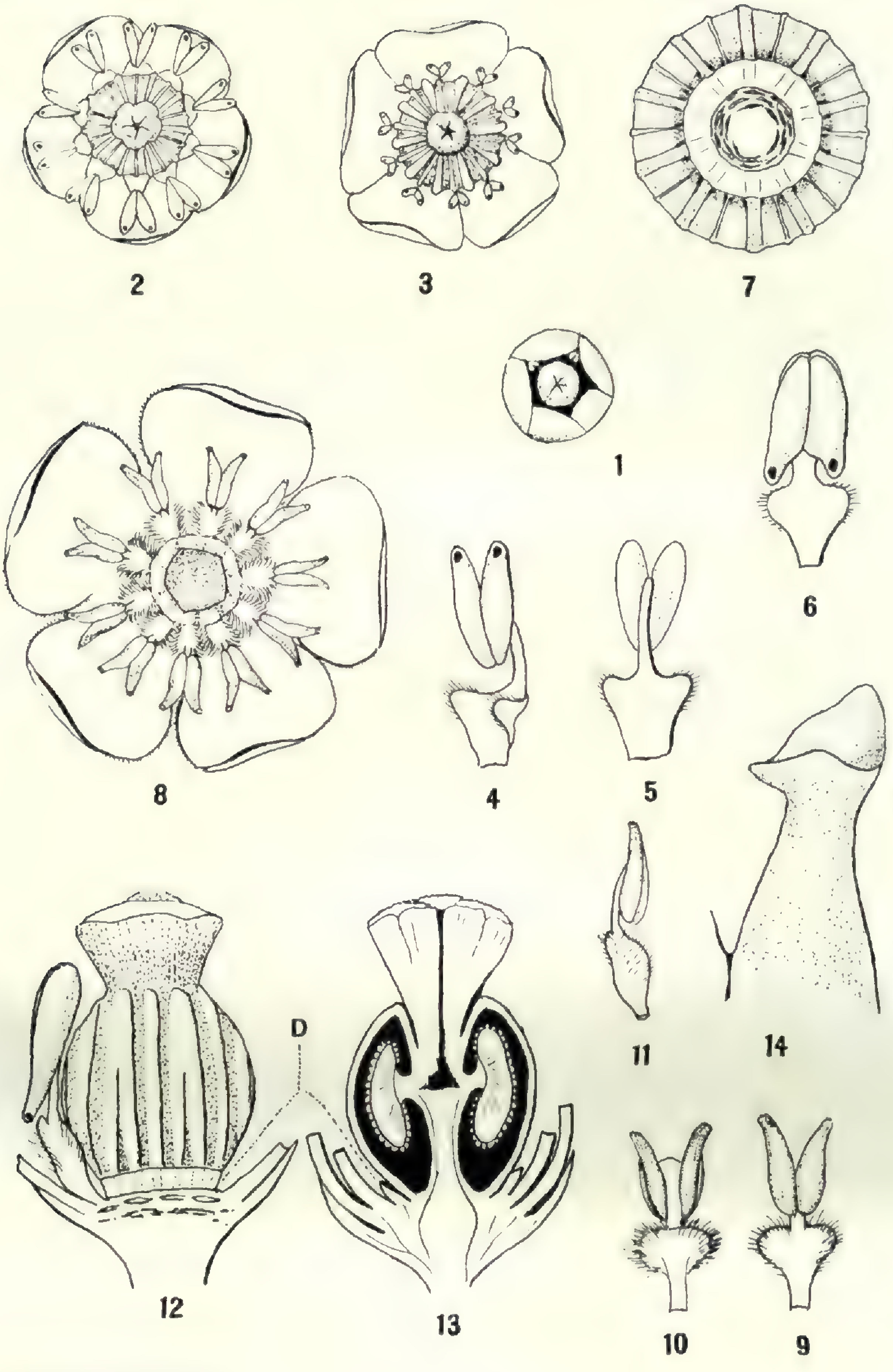
Trillum grandiflorum in Maine.—About the first of May, 1926, my friend, Miss Ella Adams, was following some boundary lines through scattered ash, birch and hemock woods in the town of Chesterville, Maine, when she happened to find a pure white Trillium. Thinking it a sport of the Smiling Wake Robin (*Trillium undulatum*) she picked it and travelled on. Soon she came to a bed of the plants and found, on returning home and consulting her Manual, that it was *Trillium grandiflorum* Salisb. The place was very damp and rocky, in open woods where yellow ladies' slippers, maiden-hair fern and other plants of damp woods grew. The heavy timber had been cut off so one could see through the scattering trees and the flowers were everywhere in great beds. My friend told me about them and we made several trips during May to the place to see the beds while they were in bloom. They reminded one of beds of white lilies and looked like a carpet of snow a short distance away. Some of the flowers measured from four to six inches across. The last trip we made the flowers were a rosy pink and nearly as pretty as when pure white. About Memorial Day we picked an arm full of the blossoms for decoration and we made slight impression on the patches, the plants were so abundant. Prof. M. L. Fernald of the Gray Herbarium writes me that so far as he is informed the species has never before been found native east of Vermont.—Florence J. Keyes, Dryden, Maine.

Two Plants New to Mt. Katahdin.—While on a walking trip on Mt. Katahdin, Maine, last September, I had the good fortune to find two plants new to the region. The first was in the North Basin, in one of the gullies of the head wall to the right of that usually ascended. Here, among the plants of *Epilobium Hornemanni* Reichenb. which lined the stream-bank, I noticed a few that looked different and had the outward characteristics of *E. lactiflorum* Haussk. When the plant was shown to Professor Fernald, he verified this assumption on examination of the seeds. This species, although well known in the White Mountains, has not been reported before from Mt. Katahdin.

The next day proved the most interesting botanically. While looking at the plants of *Saxifraga Aizoon* L. in the chimney, I noticed among them two plants of a Draba which I did not recognize, and which did not correspond to any of the Drabas described in Gray's

Manual. Although I searched the surrounding rocks, I failed to find more than two plants, so I dared to take only a stalk with the seed pods. When I showed this to Professor Fernald, he identified it as *Draba fladnizensis* Wulfen, an arctic-alpine species which had not been found before south of the Shickshock Mountains of Quebec, and is therefore new to New England. Although both the Draba and the Saxifrage are normally lime-loving, they were growing here on granite rocks in an acid soil region, and seemed quite healthy. There may be a little rich pocket in that particular spot, and it would certainly be interesting to find the soil reaction there.—G. L. Stebbins, Jr., Harvard University.

The date of the December issue (unpublished as this goes to press) will be announced later.



Theo. Holm delin.

CHIMAPHILA UMBELLATA, Figs. 1–7, and C. MACULATA, Figs. 8–14.

Farlow. Bot. Lab.

Rhodora

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 29. February, 1927. No. 338.

SOLIDAGO CONFERTA MILLER.

KENNETH K. MACKENZIE.

GREATEST of gardeners was, I believe, Philip Miller. Born in 1691, he died on December 18, 1771. During his long life, he was at the head of his fraternity in Europe, and was responsible for the introduction of a vast number of species of plants into European gardens.

His best known work was his excellent Gardeners Dictionary. This was a folio work which first appeared in 1731. It went through eight editions during Miller's life time, the last of which appeared in 1768. There was also a ninth edition by Thomas Martyn, which appeared after Miller's death. Miller also issued the Gardeners Dictionary Abridged. This passed through six editions, the last of which appeared in 1771, the year of Miller's death.

His most ambitious work was called "Figures of the most beautiful, useful and uncommon plants described in the Gardeners Dictionary." This was first issued in parts, each of which contained six colored illustrations of plants. (There was also an uncolored edition.) The first number was issued March 25, 1755, and one was issued regularly every month thereafter. So on March 31, 1759, we find Miller announcing that he had published forty-seven numbers up to that time, and had the material ready for three more parts to complete the work. These numbers were issued at five shillings each. In 1760 he issued the work as a whole. The completed work is a fine folio and contains 300 plates; and the fact that it was sold when issued for twelve guineas shows how much interest in flowers existed at that time in Great Britain, especially when one bears in mind how very much greater the purchasing power of a guinea was then than it is now.

Miller's works were published not only in English, but also in French, German and Dutch. They were all very noticeable for the great care displayed by him in the selection of the best kind of type, the best kind of paper, and the best kind of binding. The result is that copies now offered for sale are usually in excellent condition. They will undoubtedly continue to exist and give good service for many centuries after more modern works in which less attention has been given to such matters will have become useless.

In his earlier works, Miller used the old polynomial system for naming plants, but in the 1768 edition (the 8th) of his Gardeners Dictionary and in the 1771 edition (the 6th) of his Gardeners Dictionary Abridged, he adopted the Linnaean binomial system. A very considerable number of new names especially of American plants, were so published by him. Curiously, many of these names have been neglected, although his descriptions were usually full for that period; while, on the other hand, later names from that most miserable production, Aiton's Hortus Kewensis, seem to have invariably been carefully investigated.

Among the very interesting descriptions given by Miller is that of his Solidago No. 27 in the eighth edition of his Gardeners Dictionary in 1768. This, named by him *Solidago conferta,* was described by him as follows:

"27. Solidago (conferta) caule paniculato racemis inferioribus simplicibus, summis confertissimis, foliis glabris integerrimis. Woundwort with a paniculated stalk, the lower spikes simple, those at the top in very close clusters and entire smooth leaves."

"The twenty-seventh sort grows naturally at Philadelphia; the lower leaves are spear-shaped, oblique, smooth, and entire, standing upon long footstalks. The stalks rise from three to four feet high; the spikes of flowers which come out from the wings of the stalks are long, blunt, and a little recurved at the end; those on the upper part of the stalk are erect, and clustered together in a close spike; they are yellow, and appear in September."

This species has been neglected because Miller failed to refer back to his finely illustrated work above referred to—"Figures of . . . plants described in the Gardeners Dictionary." In that work he did not use the binomial system, but there fully described (p. 170) under the same polynomial as in his later work and with practically identical description, is to be found the same species. There too is given the further

information: "This sort grows naturally at Philadelphia, from whence the seeds were sent me by Dr. Bensel." But in addition to this, his beautiful colored plate 254, fig. 2, one of the few colored plates of *Solidago* ever published, makes the identification of his species very certain.

Solidago conferta Miller is the species which many years later was called *Solidago speciosa* by Nuttall, and we must adopt the appropriate name of Miller instead of Nuttall's excellent name.

Maplewood, New Jersey.

ON ERAGROSTIS PEREGRINA AND ITS RELATIVES.

H. W. Pretz.

The publication of *Eragrostis peregrina* Wiegand as a new species[1] and a local collection of this species at about the same time both served to awaken interest in a group of weed species that previously had received scant attention excepting for a mild inquiry concerning the proper identity of *Eragrostis caroliniana* (Spreng.) Scribn. and *Eragrostis pilosa* (L.) Beauv. With the full intention of making some note of the occurrence of *E. peregrina* in the local region, it was planned to give especial attention in connection with regular field work to the collection and observation of this and related species of the group but this field program was very nearly abandoned because from the very first *E. peregrina* was found to be of very frequent local occurrence. However, the apparent scarcity of material in herbaria as published by Professor Wiegand led to a renewal of interest with the result that many collections and observations were made in the years from 1918 to 1921. The intention of offering some note of this at the time was not realized but it is believed that a summary of the results of these collections and observations in the local region together with those of subsequent years may be of some value and interest and they are here briefly offered.

The first local collection of *E. peregrina* was made along a railroad but it was soon learned that, although of general occurrence and an expected species about railroad stations as well as along railroad property away from them, the plant was apparently not at all definitely related

[1] A new species of Eragrostis of the Old World and North America. K. M. Wiegand. Rhodora, Vol. 19, June 1917, No. 222, Pp. 93–96.

to the railroad so often responsible for weed introductions. It occurred not only about the towns and villages but about country churches and schoolhouses, farmyards or farm buildings, and, not infrequently, along roadsides usually closely adjacent to farm buildings or villages—places often unconnected with and away from railroads. Once it was collected along a sparsely grassy road trail through woods that was subsequently found to lead to farm buildings.

Though found so generally about farms, etc., that its occurrence came to be expected, some such places were found where it was apparently absent and it appeared to be absent from some areas of waste ground and some other places where it might reasonably have been expected to occur. An apparent absence of this kind was once noted (1924) in passing several groups of farm buildings for a distance of a few miles along the Little Lehigh creek which flows here through a limestone valley although the plant is present at places in the limestone region adjacent. Also, at some country schoolhouses and churches it was quite abundant, at others it was found only sparsely present after careful search, and at a few appeared to be absent altogether. However it is only fair to say that for lack of time or opportunity thorough search was not always possible. At a farm west of Kutztown in Berks county there appeared to be none in sight about the very favorable looking habitat furnished by the farmyard but after careful search some was found growing in a weedy, turfy association close to the farmhouse fence so that its absence can not safely be presumed unless thorough and careful search be made. In some farmyards it was found to grow abundantly even in areas where severely trampled and it has been observed in such places as well as elsewhere to occur with thick weedy association. Where it occurred along roadsides it was always as a weed, or with the weedy association, of more or less disturbed ground.

In Allentown it has been noted practically throughout the city as a roadside gutter species in unpaved streets, on sidewalks, on cinder or soil strips between pavement and curb on sidewalks, about sidewalk openings around trees, on brick strips of sidewalks, etc. At one place close to the business centre of the city where streets are all paved it has been noted in chinks and hollows on one part of the stone covered plaza of the county courthouse. Across the street on a pavement it fairly outlines in its very abundance the bricks of the strip on either side of the flagstones and has almost the appearance of

a turf. At still another corner it has been noted for years in a slight depression protected from footsteps and where slight soil exists in such a brick strip beside a marble steps. Similar conditions prevail in small towns and villages where it has been found to occur sparsely, abundantly or frequently along gutters, sidewalks, etc.,—conditions so largely identical with those noted for the Philadelphia region by Mr. Bayard Long[1] that further detailed record here seems unnecessary.

As a guest, a few trips were made by automobile through parts of counties adjacent to Lehigh upon which there were some opportunities to make a few collections and observations. On one of these trips from Riegelsville along the Delaware river through upper Bucks county adjacent to Lehigh county, collections were made at two places in Riegelsville, about a road at the sheds of an old historic Mennonite church near Pleasant Valley, and at a farm near Fairmount, all widely separated stations. On another trip to near Douglassville along the Schuylkill river, a distance of over thirty-five miles from Allentown, collections were made in Berks county at a schoolyard at Bally, a schoolyard between Eschbach and Bechtelsville, on a pavement about in the business centre of Boyertown, a roadside entrance to a farmyard near Douglassville, and before the hitching post of the hotel at Amityville, all widely separated stations. Short excursions of like character have been made westward into Berks county and, besides one collection from a farmyard near Kutztown, a number of occurrences in this general region have been noted. More recently on trips afoot it has been collected at Bingen railroad station in Northampton county and it has been observed at a schoolyard and two roadside stations near to farm buildings (three widely separated stations) along another road in upper Bucks county closely adjacent to Lehigh county. The observations and collections on these few trips certainly lead strongly to the inference that the occurrence of *E. peregrina* is very similar to that observed more intimately in Lehigh county.

Though collections were not made from many observed localities, a series of collections of *E. peregrina* numbering seventy-five was made in Lehigh county alone. Of these, sixteen came from about Allentown and some few others might be considered as duplicating a locality. Similarly, over sixty collections of *E. caroliniana* were made, twenty-

[1] *Eragrostis peregrina* a frequent plant about Philadelphia. Bayard Long, Rhodora, Vol. 20, Oct. 1918, No. 238, Pp. 173–180.

four of which came from about Allentown. *E. pilosa* is represented by twenty-three collections in Lehigh county from fourteen localities. In the region under observation outside of Lehigh county, eleven collections of *E. peregrina* and three collections of *E. caroliniana* were also made. A series of these collections is at the Academy of Natural Sciences of Philadelphia where they have come under the observation of Mr. Bayard Long who in addition to thus verifying determinations has been of most valuable assistance in confirming by his own experience some of the observations recorded in this note, as well as in other ways.

These collections consist of several hundred individual plants bearing panicles ranging in condition from immature to overripe and showing wide variation in luxuriance, habit of growth, etc., at least in part correlated with the habitat in which they were found to occur. Such a series, collected primarily for distributional data, naturally offers a good opportunity for further study of the species in relation to the species group of which it is a member but it is not the purpose of this note to add to the published diagnosis by Wiegand[1] and Long[2] of the characters of this admittedly complex species group. In spite of the rather wide variation displayed in these collections of members of this species group, examination of the material has shown the characters as already published to have strong validity. Although the material collected could be quite consistently referred to the separate and respective specific units, the need for further study in the group was constantly recognized.

The very abundance of material observed (as well as collected) in the region has made even a record of some general observations or impressions as to distribution, habit, etc., gained through field work seem hazardous. Frequently *E. peregrina* was found occuring with *E. caroliniana* but each has been found to occur where the other was apparently absent and their coincidence appears to be purely accidental. Though erratic in distribution like many other weed species, both of these species were found to be widespread in frequence throughout Lehigh county, if not general, but there appeared to be no relation between them as to comparative abundance, which was a matter of great variation in both species. For instance, at one place hundreds

[1] A new species of Eragrostis of the Old World and North America. K. M. Wiegand. Rhodora, Vol. 19, June 1917, No. 222, Pp. 93–96.

[2] The specific characters of Eragrostis peregrina and its two allies. Bayard Long, Rhodora, Vol. 21, Aug. 1919, No. 248, Pp. 133–140.

of plants of *E. caroliniana* lined for a short distance both sides of a country dirt road about the distance of a city block away from any farmhouse while *E. peregrina* was confined, as far as could be determined after some search, to a very limited occurrence of comparatively few plants. It would seem that, as already noted, both *E. peregrina* and *E. caroliniana*, though occurring in cinder or other ballast along railroads and in some waste ground, normally are elsewhere plants of disturbed ground related to habitations and usually found closely adjacent to them.

The truth of Professor Wiegand's statement that *E. peregrina* "can be readily recognized by its general appearance" was abundantly demonstrated in the field. After some experience it was even felt that—together with *E. caroliniana*—it could be fairly or even rather confidently recognized, especially where it grew abundantly, from moving cars, automobiles, etc. Though it has not been necessary to use such observations for the purposes of this note, observations of this kind were often helpful in marking or locating occurrences from which collections and observations later were made. Though both of these species vary considerably in height and luxuriance mainly according to habitat, *E. caroliniana* is more normally the taller in average material. It is also normally a larger, bushier, more diffuse plant of many more slender, ascending branches than *E. peregrina*, which is normally smaller, more stocky or stout in appearance, even in small or tiny plants, and with a greater tendency of spreading its fewer stouter branches horizontally on the ground to a node from which the stem arises upright. Plants of *E. caroliniana* are lighter green in color than *E. peregrina* and in one place, visited several times, where the two species grew together, they appeared to be readily separable vegetatively before they came into flower or fruit.

Any difficulty[1] that has arisen in the ready recognition of the members of this species group in the field, has come through the presence in the local area of a plant apparently referable to *E. pilosa*. Unlike *E. peregrina* and *E. caroliniana* of rather general distribution, as far as known, this latter plant appears to have a distribution in the local area that is quite different and only in part coincident with the above named species. Collections and observations appear to indicate that

[1] *Eragrostis Frankii* Steud., collected at fifteen stations in Lehigh county and observed at others, has proven to be readily distinguishable in the field from the members of the species group here considered.

this species occurs in its greatest frequence across the "shale" region parallel and quite closely adjacent to the Kittatinny or Blue mountains in Lehigh county. It has been collected at a few rather widely separated stations in the "shale" region southward and at two places in the Saucon valley south of the South mountains. A few very small plants apparently referable to *E. pilosa* were collected with some equally poor or depauperate material of *E. peregrina* on the cinder roadbed of the Perkiomen Railroad along the base of the north slope of the South mountains southwestward of Emaus station but elsewhere locally it has not been found to occur like the frequent and often abundant *E. peregrina* and *E. caroliniana* about railroads. It has been found to occur alone or with either *E. peregrina* or *E. caroliniana*, or both, but elsewhere than over this range in Lehigh county it has not been detected in the local region.

Though associated with habitations, *E. pilosa* has been collected and observed to occur along roadsides especially where fields are ploughed to the edge of the road or its gutter, about unworn spots of road intersections or little used dirt roads, etc. In such places it is frequently quite abundant. Near habitations or at road intersections where it may be trampled and grow in low turf-like mats, it may appear quite deceptively like abundant *E. peregrina* in general appearance. *E. pilosa* normally appears to be a taller, more slender, generally erect, plant than *E. peregrina* but otherwise in general appearance it suggests a stronger relationship or affinity with that species than with *E. caroliniana* which however in turn in general appearance seems more closely related to *E. pilosa* than to *E. peregrina*. This impression that *E. peregrina* and *E. caroliniana* appear to be more closely related to *E. pilosa* than to each other has merely been suggested by such difficulties as developed through abundant experience in the recognition of the members of this species group by appearance in the field and not through any analysis of the characters. That the panicles of *E. pilosa* are of a deeper, more reddish, purple color than in *E. peregrina* is probable but by no means certain. The impression prevails that the more grayish purple of local *E. caroliniana* is quite readily distinguishable from the color of *E. peregrina* but *E. pilosa* offers more difficulty in this respect.

There is a most striking difference between *E. pilosa* and both *E. peregrina* and *E. caroliniana* in the time of first fruiting. Both of the latter first come into flower and fruit at about the same time

though possibly *E. peregrina* may be slightly the earlier. *E. peregrina* has been noted as early as June 20th (1921) along the streets of Allentown with panicles spread in fresh flowering or fruiting condition and this date might be accepted as approximate for extreme earliness for the species locally. Similarly *E. caroliniana* has been collected as early as June 30th (1918). Local field experience has shown that *E. pilosa*[1] is about a month later—or even more—in reaching a similar condition. Recently (1925) three roadside stations for *E. pilosa* were visited on July 12th and August 30th in an effort to confirm further this observation. At one station a grassy association had spread out over the little used road and no *Eragrostis* was detected at all. On the earlier date at one of the other stations no *Eragrostis* was found after careful search and at the other a few plants with rather fresh immature panicles, mostly unexpanded, were discovered that could be referred to *E. pilosa.* Later however on August 30th, *E. pilosa* was found in fair abundance locally along the roadsides at both of these latter stations with fresh panicles. Late in the season all three species may be found in fresh flowering or fruiting condition together and it has not been possible to correlate this late fruiting of seemingly fresh plants of *E. peregrina* and *E. caroliniana* after the first or early fruiting plants—a condition that must not be confused with fresh bloom from the lower nodes of old plants with barren panicles of earlier fruiting.

As far as known there have been few published records of the occurrence of *E. peregrina* since Mr. Bayard Long has shown it to be a widely distributed species in the Philadelphia and adjacent region.[2] A survey of those parts of Lehigh county visited has shown *E. peregrina* to be widespread and abundant and to occur, not as a waif, a new, casual or spontaneous introduction, but as a weed firmly established by long occupancy,[3] even though displaying all the erratic

[1] There was less opportunity to observe *E. pilosa* in the field than in the case of either of the other two more widely distributed species. However at one place where the species was abundant it was possible with comparatively little effort to secure a number of plants in which the first branch of the panicle was single instead of the usual two or a whorl of branches which is a character of *E. pilosa* so constant as to be almost distinctive. *E. peregrina* appears consistently to have the first branch of the panicle single.

[2] Eragrostis peregrina a frequent plant about Philadelphia. Bayard Long, Rhodora, Vol. 20, Oct. 1918, No. 238, Pp. 173–180.

[3] It may be interesting to note in this connection that *E. peregrina* was collected about Philadelphia as early as 1864 and that two collections in the Porter herbarium from Lancaster, Pennsylvania—a town in Lancaster county over fifty-five miles southwest of Allentown and in the drainage of the Susquehanna river—were made in 1889 and 1898. See paper of Mr. Bayard Long, cited above.

characteristics in behavior, frequence, etc. of a weed species. This condition is shared by *E. caroliniana* and, in part, by *E. pilosa* of this species group. Mr. Long has shown conditions and the distribution in the Philadelphia and adjacent region to be largely identical and has also shown a general relationship with the local region through several outlying stations, one of them from Lehigh county. It is strongly presumed from the observations and collections already made in the counties adjacent to Lehigh county that conditions in these areas will be found on more intimate investigation to be quite similar to those in Lehigh county. The general region northward toward and in the mountains beyond the limits of Lehigh county has not been touched and the outposts locally have not been reached. Thus there has been neither time nor opportunity to extend further the limits of occurrence of *E. peregrina* in the general local region. However in this brief note, apart from the specific conditions noted for Lehigh county, a general relationship with the Philadelphia region has been definitely indicated and it is hoped some information has been offered that will not only be useful in an understanding of the general relationship of this highly complex and difficult species group but that will be helpful as well in establishing the general distribution of *E. peregrina* in America.

Allentown, Pennsylvania.

USAGE.

Kenneth K. Mackenzie.

In an article which has just appeared in Rhodora (**28**: 138) Mr. Weatherby touches on many points. He most earnestly and fully believes in his point of view and is therefore entitled to the fullest respect for his views. He deals with a number of different subjects. He fails to consider where his suggestions would lead, if applied. He is often delightfully vague. Some of the matters touched on are not of any general importance, but there are others which do very much deserve notice.

In the first place, it should be emphasized that the greatest curse which science has to deal with is laziness and mental inertia—the desire that because one has learned a thing in a certain way, that it should always remain that way. A matter so learned to an in-

dividual with this view-point has become "usage." He sets himself up from his own horizon to judge the world and illustrates the old view that every man makes himself a measure of the universe. Because a few books have become known to such an individual and have become the basis of his knowledge, he regards them as sacrosanct. Because for a few years and among a few scientists certain methods have been followed, he regards these as required in perpetuity by what he calls "usage." The law long years ago had similar views presented, and emphatically settled that much more is required to constitute good usage.

We each and all have deeply imbedded in us a desire not to have things to which we are accustomed changed. A well known scientist puts the matter very correctly in a letter in which he says "I do not suppose I have any right to complain personally, for I did a bit of it myself not so many years ago, but it is much more difficult to accommodate one's self to the changes made by somebody else." But if we are to have progress, we must view all suggestions of change with open mind and apply only one test to them; that is, whether they are correct or not.

I earnestly submit that real science should always, first, last and all the time aim to get at the truth. No question of convenience or anything else should stand in the way of getting at the truth. That is the one thing which should always and under all circumstances be aimed at. Errors of every kind should be searched out and corrected, regardless of whether finding and correcting them will make some individuals unhappy. Scientists all over the world have properly held up to scathing criticism and rebuke actions of the legislatures of southern states in prohibiting the teaching of evolution, but scientific circles averse to correction of their own errors—fighting for and desiring to hold to them on the ground of usage or any other euphemistic phrase for mental inertia—are just as blameworthy. And it may be noted here what these southern states are upholding to them is usage and usage which to them is of a sacred character. They have a basis of religious conviction for their action, which is entirely lacking among those scientists to whom usage is so important.

Another thing it is also earnestly submitted which is equally necessary and equally important, is the need to treat all scientists fairly and on the same basis. When scientists adopted the plan of quoting the authors of scientific names in connection with their names, they

adopted a plan, one of the purposes of which was to give some measure of enduring recognition to authors who rarely, if ever, got anything else out of a lot of hard work. But when such a plan is adopted, the fair and honest procedure is to see that each author is given credit for the work he does. When A proposes a genus or a species and later on B proposes the same genus or species under another name, the proper thing to do is to take up and use the first name. But here again we come up against the same mental inertia so often characteristic of scientific work. Some few botanists will have become acquainted with the work of B and not with the work of A or the work of B may have been put out by some large institution and the work of A not. Then the cry is at once set up that the work of B has become known through "usage" and his names must be placed in a list of nomina conservanda and always used, while the first work of A must be relegated to obscurity. One would think that it would be the easiest thing in the world to learn these earlier names once for all, and that the amount of labor in so doing would be infinitely less than the amount of labor and trouble involved in having some scientists using the names of B and some using the names of A. And to save a little trouble is the only reason for a list of nomina conservanda. But learning unaccustomed names is for some reason one of the hardest things which a certain type of scientist can bring himself to do—his entire nature calls on him to protect and cherish the names with which he himself has become familiar. Like the scenes of his childhood, they are part of his life, and woe be it unto anyone who in any way dares to attack them. But let anyone suggest that a name proposed by any such scientist himself should be arbitrarily legislated against and then see with what enthusiasm the suggestion will be received by such scientist!

Of the specific suggestions made by Mr. Weatherby the first to be noted is his very great over-emphasis on the value of specimens in old herbaria. Unfortunately this fails to take into account the situation with respect to these old herbaria and the extent to which the specimens are authentic. The questions involved have been carefully gone into by various scientists and their papers are readily accessible. Some years ago Dr. T. Holm (Am. Journ. Sci. (4) **15**: 145–152. 1903) went into the facts involved fully. The following quotations are from his article.

"The futile endeavor on the part of certain modern systematists to

verify plant-species, established by the earlier authors, by means of their herbarium-specimens but regardless of the diagnoses, has resulted in some very strange discoveries, so strange indeed that they are hardly to be believed. And the excuse for not considering the diagnoses is simply the belief that the herbarium-specimens are to be looked upon as "types" of the respective species. . . . It would appear at once that the verification of such old species means a good deal more than a hasty examination of the specimens, that no small amount of literary research is involved, a study of the author's method of describing, of citing, the history of the herbarium as it has been left at his death, etc. . . . There is no indication whatever to prove that the specimens preserved in these old herbaria are those that served as base for the diagnosis. . . . It is a well-known fact that a large number of the specimens collected by Linnaeus do not correspond with the diagnosis, written by himself. . . . It is, thus, evident that Linnaeus' species must be studied by means of his diagnoses and not from the specimens or quotations, and this is, of course, in many instances, quite a difficult task."

To follow Mr. Weatherby's intimations and identify Linnaean species by his specimens regardless of his descriptions, would result in an extraordinary number of changes of names. Dyckes (Genus Iris, p. 6) says about half the *Iris* specimens are incorrectly named. Gray (Proc. Am. Acad. **17**: 177–9) found the *Solidago* badly mixed. I have gone over the *Carex* sheets and the incorrectly named ones are there in abundance. I am sure that a similar condition exists in the other genera.

In studying these old species and genera, I try to put myself in the place of the author, and where he had what has turned out to be a mixture, I try to find out what he had primarily in mind, and to that element I apply his name. Where he has given a description, I apply his name to a plant answering his description, except where he gives clear indications that this is not the proper course. Where he has given no description, but based his species on references to older authors, some having plates and others not, I know from my own experience in similar matters, that in all probability he was many more times influenced by the plates than by the older descriptions and therefore in such cases names are ordinarily applied in accordance with the plates. Specimens in his herbaria are often of the greatest possible value in doubtful cases, but what an author wrote must always be

given preference. The method pursued is the type-method. It is the method which has been in use for many, many years by many botanists in one way or another. Calling it the type-method merely emphasizes the need of some definite procedure in this class of investigation; and the rules of the type-method simply point out the best criteria for use in trying to find out what authors have really had in view. These rules when properly understood and applied are in no sense arbitrary, but are a wonderful help in arriving at results which are not arbitrary, but which best express what previous authors had in mind. The statement that older authors did not work with types is entirely wrong. They could not have done any work at all if they had not had material before them with which to work; and from such material, whether a plant in the field, a specimen in the herbarium, a plate or a description from a previous author, do we select what best expresses an author's view and call it a type.

Concerning *Solidago rigida,* I am sorry that Mr. Weatherby fails to let us know what he thinks the plate of Hermann represents. He surely does not identify it with the "*Solidago rigida*" of the manuals. It is in fact an unusually excellent illustration, as far as foliage is concerned, of the plant with which I identified it. That plant does have stem-leaves to which the phrase that the leaves are "as if embracing the stem at the base" does apply, as Mr. Weatherby could easily find out on investigation. In fact this phrase applies better to that plant than it does to the *Solidago rigida* of the manuals. That plant as is well known also does have forms in which the racemes are not recurved but erect and fascicled. Hermann in order to illustrate a tall plant without bending on a small page, cut off parts of his specimen both at the bottom and at the top, as he did with many others. His illustration shows undeveloped flowers or small clusters far down the branchlets from the developed flowers shown—a result probably arising from growing American plants under European conditions. (See Gray Proc. Am. Acad. **17**: 163. 1882.)

Anyone comparing *Solidago rigida* of the manuals with this plate with any degree of care at all, would not attempt to justify their identity, and I do not understand that Mr. Weatherby makes any such identification. He is merely vague. The Linnaean name is taken from Hermann's name. All his citations refer to the same thing. His polynomial semi-descriptive name in the Hortus Cliffortianus is evidently based on Hermann's plate and description as

every word is applicable, just as many of his names and descriptions are based on old plates and descriptions. He cites this name in the Species Plantarum with one word changed just as he and other older authors did constantly in citing names. The species is not listed among those which grew in the Cliffortian Gardens in the days there of Linnaeus (Virid. Cliff. 85–86), and it is not probable that anyone can now tell how the specimen labeled *Solidago rigida* in the Linnaean herbarium came there or whether it was in existence when he wrote the Hortus Cliffortianus. The proper thing to do is to apply definitely his name to the plate and descriptions he cited, and that requires, as I previously pointed out, the use of the name *Solidago rigida* for the plant which has been called *Solidago patula* Muhl.[1]

It so happens that I have dealt with the purple-flowered *Eupatorium* question further in another paper, prepared before Mr. Weatherby's paper came to hand. His views on the International Rules seem either "wholly without authority" (whatever that means), or a good illustration of how hopeless those rules are to interpret. He is a firm believer in the arbitrary method. No rules of nomenclature are needed by adherents of these views. All that is required is a mere list of names with the ukase that these names and none others shall be used. Anything more is needless.

Let me say before concluding that after checking up a great many names, I have been more and more impressed with how well and how definitely the vast percentage of them have been applied and how well and how definitely the principle of absolute priority quickly works out as compared with that vague and indefinite thing known as usage.

I am sorry indeed to note that Mr. Weatherby has seen fit to sneer at a study of the older authors and to term such investigations "archaeological." I would recommend all botanists to study these old works, and I would especially recommend to members of the New England Botanical Club the need for the broadest kind of study. These old books are full of useful information of all kinds. Their

[1] In this connection, it is to be noted that in the Linnaean herbarium *Aster novae-angliae* L. is represented by *Aster grandiflorus* L.; *Aster cordifolius* L. is represented by *Aster divaricatus* L. (*A. corymbosus* Ait); *Aster Tradescanti* L. is represented by *Aster paniculatus* Lam.; and *Aster Novi-Belgii* L. is represented by *Aster puniceus* L. and by *Aster paniculatus* Lam. In all of these cases, Gray went back into the old synonymy cited by Linnaeus, found the starting point for each species, and applied the Linnaean names accordingly. In each of these cases, he disregarded the specimens in the Linnaean herbarium. In other words, in each one of these cases he did exactly the same thing which I did in the case of *Solidago rigida* L. (Gray, Proc. Am. Acad. 17: 164–8. 1882).

authors were often not able to describe floral structures well and often failed to illustrate them well, but they made up for this by much more fully and carefully studying other parts of the plant. The advent of the Linnaean sexual system of classification had a very bad effect on the study of all parts of plants except the flowers, and that has to a very considerable extent persisted to this day. It is very noticeable in our botanical manuals. But much of this other information is well brought out in these older authors. And I never go over their pages without a greater respect for their labors and learning and their desire for knowledge and their desire to impart it. I never feel like sneering at such work.

Maplewood, New Jersey.

Equisetum pratense in Berkshire County, Mass.—*Equisetum pratense* Ehrh. has apparently never been reported from Berkshire County, Mass. and its actual occurrence there may be worth recording.

It adds one more to the long list, well known to any field botanist, of interesting things found while stopping for lunch. During such a stop in the course of an automobile excursion, in the valley of a small tributary of the Blackberry River in the township of New Marlboro, my attention was attracted by some lustrous-leaved willows, probably *Salix serissima,* in a nearby thicket. Investigation showed that the thicket also contained a small but vigorous colony of *Equisetum pratense.* A specimen will be deposited in the herbarium of the New England Botanical Club.

E. pratense is known from three stations in the Housatonic valley in Connecticut, the northernmost within three miles of the Massachusetts line. There seems to be no reason why it should stop there; although a species of rather scattered and discontinuous distribution in New England, it may be hopefully looked for in the Housatonic valley in Massachusetts.—C. A. Weatherby, Gray Herbarium.

The dates of issue of the December and January issues (unpublished as this goes to press) will be announced later.

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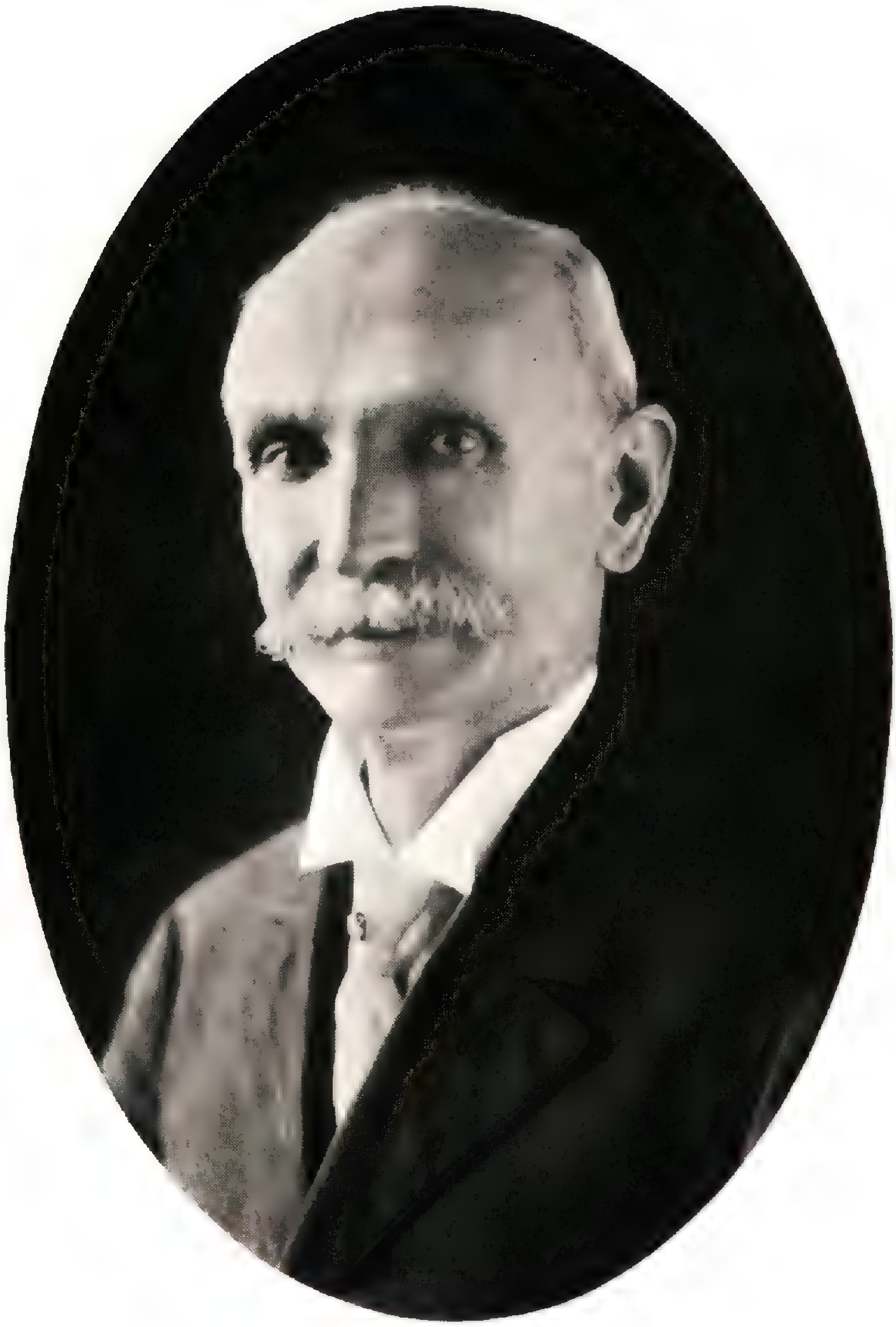

Yours sincerely
M. W. Gorman

Rhodora

JOURNAL OF

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Vol. 29. | March, 1927. | No. 339.

M. W. GORMAN.

JAMES C. NELSON.

(*With portrait.*)

THE death of M. W. Gorman, which occurred in the Good Samaritan Hospital in Portland, on Oct. 7, 1926, removes from the scanty ranks of Oregon botanists the last of our picturesque trio of pioneer field-botanists—Howell, Cusick, and Gorman—men of a type now rapidly becoming extinct, who, without formal scientific preparation or academic position, were animated by an intense love of science, and who devoted their energies to a study of the native flora, often under the most adverse and discouraging conditions. It is idle to speculate on what, with better preparation, they might have accomplished. Howell's Flora of Northwest America, considering the circumstances under which it was produced, raises its author almost to the rank of a genius, and forcibly calls to mind the work of that other tireless investigator and pioneer, Joao de Loureiro, in Cochin China; and during the years in which Howell was struggling with difficulties and discouragements of every sort, Mr. Gorman was his constant associate and faithful friend, whose modesty and self-effacement alone prevented him from claiming the title of collaborator.

Martin Woodlock Gorman was born at Douglas in the Province of Ontario, Nov. 10, 1853, the son of Peter and Mary (Woodlock) Gorman. His father, a Canadian of Irish descent, was engaged in the lumber business in his younger days, but retired from active business after inheriting the paternal homestead at Douglas. His mother, a native of Ohio, was also of Irish descent. The young Martin seems to have inherited an interest in trees from his father;

he was fond of telling his friends how he spent many youthful hours transplanting all the species of trees he could find in the forest to a little plantation of his own—a sort of miniature "Arboretum."

After securing a common-school education, he left home at the age of 16 to clerk in a store, and at 20 went to Montreal, where he spent eleven years in office work. During this time he occasionally attended the lectures of J. W. (afterward Sir William) Dawson, the geologist, at McGill University, and made the acquaintance of John Macoun, then botanist of the Canadian Department of Agriculture. In 1885 he came to Portland, Oregon, where he was at first a clerk in a bank, but after a few years became travelling representative of a salmon-cannery operated by relatives of his in Alaska. This work gave him the longed-for opportunity to study the flora and fauna of the Pacific Coast. In his business capacity he made five trips to southeast Alaska between 1890 and 1895. In 1898 he joined the gold-seekers who were flocking to Dawson, and penetrated into the Yukon Territory to a point on the White River 200 miles above its confluence with the Yukon. Although wholly unprovided with facilities for pressing or drying specimens, "the call," as he often phrased it, "was strong," and he collected assiduously during the trip. Many of his specimens were lost in a tragic accident resulting in the drowning of his companion, and his own miraculous rescue by a wholly unexpected boat; but he brought out at least ten new species, and as great an authority as E. L. Greene declared that the results of this trip surpassed in value those of the fully-equipped Harriman Expedition.

At the close of the Lewis and Clark Exposition, held in Portland in 1905, all the buildings were demolished except the Forestry Building, which was taken over by the city as a permanent memorial, being constructed wholly of Oregon timber in its native state, in the form of a gigantic Swiss chalet. Of this building Mr. Gorman was appointed Curator, and held the position until his death—which ensued as the result of pneumonia following a cold caught while raking leaves about the grounds. His little room in the building, filled to overflowing with books, papers and specimens, was the unfailing resort of all botanists who visited Portland. In his summer vacations he made collecting trips to all parts of Oregon and Washington; he has left a record of 17 of these trips, almost every one of which resulted in notable extensions of range or discovery of new

species. He minutely botanized the environs of Portland, making a special study of the disappearance of native species under the encroachment of civilization; and to accompany him on one of these trips was a rare privilege, for he not only saw everything and detected the slightest change of environment, but had the happy faculty of pouring forth a running commentary of reminiscence and illustration, tinged with genial Irish wit, that made his society eagerly sought. He never married, but his kindly and unselfish disposition prevented him from developing into the classic old-bachelor type. His interest in humanity was unfailing, and his charity and tolerance seemed never to be exhausted. Much-abused as the word "gentleman" has been, it could with little exaggeration be literally applied to him; he represented the finest ideals of his race. He was wholly free from vanity or self-seeking, painfully modest as to his own attainments, always ready to subordinate his own judgment, and never indulging in harsh or carping criticism even of those whose views were most widely divergent from his. To the end of his life his botanical interest was chiefly directed toward the trees and shrubs; but he collected everything, and devoted a large part of his time to making determinations for his many correspondents. His long association with Thomas Howell made him an admirable commentator on the Flora of Northwest America; he had accompanied Howell on many of his expeditions, and was able to give detailed information as to time and place of collection of many of his species. His own large collection he never wholly reduced to order, but by the terms of his will it becomes, along with his books and papers, the property of the University of Oregon.

The genus *Gormania* (*Crassulaceae*) was named in his honor by Dr. Britton,[1] but it is unfortunately too close to *Echeveria* to be maintained by many Eastern botanists. Of the species which he discovered, and in some of which his name has been commemorated, the following may be mentioned:

1. *Cardamine neglecta* Greene
2. *Lomatium Gormani* (Howell) C. & R.
3. *Sisyrinchium littorale* Greene
4. *Aquilegia columbiana* Rydb.
5. *Ranunculus Gormani* Greene
6. *Polypodium hesperium* Maxon
7. *Betula alaskana* Sarg.
8. *Androsace Gormani* Greene
9. *Pentstemon Gormani* Greene
10. *Ranunculus vicinalis* Greene
11. *Arnica attenuata* Greene
12. *Bistorta ophioglossa* Greene
13. *Erigeron purpuratus* Greene

[1] Bull. N. Y. Bot. Gard. 3: 29. 1903.

14. *Erigeron Gormani* Greene
15. *Astragalus Gormani* Wight
16. *Panicum pacificum* Hitchc. & Chase
17. *Eucephalus Gormani* Piper
18. *Claytonia chrysantha* Greene
19. *Saxifraga Gormani* Suksd.

Although Mr. Gorman possessed to a high degree the ability to write clearly and picturesquely, he published little. The following list seems to represent the total of his published work:

1. Economic Botany of Southeastern Alaska. Pittonia **3**: 64–85. 1896.

2. Report on the name Mazama. Mazama **1**: 5. 1896.

3. Discovery and Early History of Crater Lake. Mazama **1**: 150. 1897.

4. Eastern Part of the Washington Forest Reserve. 19th Ann. Rep. U. S. Geol. Surv. Pt. **5**: 315–350. 1898.

5. Complexities of the Diamond Hitch. Mazama **2**: 242. 1905.

6. Vegetation of the Northwest Slope of Mt. Baker. Mazama **3**: 31. 1907.

7. Useful Books on Botany for the Mountain Climber. Mazama **4**: 51. 1915.

8. Two Useful Botanical Manuals. Mazama **5**: 87. 1916.

9. Flora of Mt. Hamilton, Washington. Mazama **6**: 67–77. 1920.

"Mazama," it might be explained, is a periodical appearing at irregular intervals in Portland as the organ of "The Mazamas," the local Alpine club, which each year officially ascends some chosen peak in the mountains of the Northwest. Mr. Gorman was an active and enthusiastic member.

The botanists of Oregon are so lamentably few in number, and the flora of the State is still so imperfectly known, that the loss of even a single worker seems far more irreparable than in the more fortunate East; while to those who were privileged to be friends as well as fellow-laborers, no tribute will seem adequate.

"Multis ille bonis flebilis occidit:
Nulli flebilior quam mihi."

SALEM, OREGON.

OCCURRENCE OF PYTHIUM GRACILE IN THE UNITED STATES.

F. K. Sparrow, Jr.

While examining a culture of *Spirogyra crassa* Kütz. in search of fungus parasites, a fungus that was later identified as *Pythium gracile* Schenk, was found infecting certain of the filaments. As far as the writer has been able to ascertain, this fungus has never before been recorded from the United States either on this, the host on which it was originally described by Schenk, or on any other alga. Therefore the following brief note as to this occurrence has been prepared in the hope that it may prove of value to others interested in the group.

The host, *Spirogyra crassa*, was found October 20, 1926, in a small, quiet pond near Belmont, Massachusetts. Upon examination, several filaments, with cells growing vigorously and in active division, were found to have non-septate mycelium spreading freely from cell to cell within them and extending lateral branches outside into the water. One of the infected filaments was transferred to a Van Tieghem culture, where, within the host cells after nine days, numerous oogonia and antheridia were formed. No fecundation, however, was observed and no mature oospores were found. Several days later, non-sexual reproductive structures were developed and by means of these and the earlier sexual stage, the fungus was identified as *Pythium gracile* Schenk. Uninfected filaments of *Spirogyra crassa* healthy and in vigorous condition, when placed in these drop cultures containing the Pythium, were rapidly and readily penetrated by the mycelium of the fungus, thus indicating it was not merely a weak parasite able only to attack the alga in a condition of lowered resistance.

Of the other members of the Pythiaceae parasitic upon Spirogyra, *Pythium gracile* has been separated from the closely related *Pythium tenue* Gobi, mainly on the absence in the latter fungus of cross walls separating the antheridia and zoosporangia from their vegetative hyphae. In the Pythium here reported these septa were, indeed, found but their presence below the antheridia was established with difficulty because they were only faintly discernible while these organs were young and soon dissappeared as they matured. The several known species of Pythium, parasitic upon green algae, resemble each

other in their vegetative hyphae and in their non-sexual reproduction but differ in their sexual organs. *Pythium gracile* as originally described by Schenk did not form sexual reproductive bodies and consequently the interpretation of his species is somewhat difficult. Butler (1) has summarized admirably the confusion that exists regarding the exact identity of the members of the sub-genus Aphragmium, to which *Pythium gracile* belongs, and there is no need of going further into that point here. The identification of the present species as *Pythium gracile,* seems however, thoroughly in accordance with the accepted concept of that species.

Pythium gracile was first reported and described from Germany by Schenk (6) in 1859 on *Spirogyra nitida, Spirogyra heeriana* (*crassa*) and Cladophora (sp. ?). Ward (5) (1883) found it in Spirogyra (sp. ?) in Great Britain. De Wildeman (3) (1895) reported its occurrence, under the generic name Nematosporangium proposed by Schröter, in France and Belgium on Spirogyra (sp. ?) and Cladophora (sp. ?). It was again reported from Germany by De Bary (2) (1860) who found it parasitic upon Vaucheria (sp. ?) and *Bangia atropurpurea* and described it at that time as *Pythium reptans* on the basis of its non-sexual stage only. Butler (1) (1907) observed the fungus on *Vaucheria aversa,* collected in Freiburg, Germany and found what was possibly the fungus on Spirogyra (sp. ?) in India, but as no sexual stage developed in this latter case he was not certain as to its true identity. The same investigator also found this species in India growing saphrophytically in the soil, in old water-cultures on Abutilon roots and on decaying Marchantia plants. He further described it as occurring in India parasitic upon *Ricinus communis* and upon *Zingiber officinale,* to which it was seriously injurious.

A search through the literature, including Rabenhorst's "Kryptogamen Flora," Engler and Prantl's "Die Naturlichen Pflanzenfamilien," Saccardo's "Sylloge Fungorum," Oudemans' "Enumeratio Systematica Fungorum," Farlow's "A provisional Host Index of the Fungi of the United States" and the proof sheets of the host index in preparation at the Farlow Herbarium, has failed to uncover a single reference to this fungus in the United States. Indeed, only one mention of the occurrence of *Pythium gracile* in the whole of North America was found, published in the list of fungi collected during the Harriman Alaskan Expedition of 1899 (4). It was collected by De Alton Saunders on Popof Island, where it occurred

parasitic in vegetative filaments of *Spirogyra porticalis.* The identification of the fungus was made by Dangeard but no plates or description were given.

The finding of this fungus in Massachusetts, as here reported, probably indicates a more widespread distribution than the few records hitherto published would seem to indicate and in the course of further collection, it is to be expected that it will be encountered elsewhere in the United States.

Literature.

1. **Butler, E. J.** 1907. An Account of the Genus Pythium and Some Chytridiaceae.
Mem. Dept. Agr. in India. Bot. Series, Vol 1, No. 5. pp. 61–71 Plate I.
2. **de Bary, A.** 1860. Einige neue Saprolegnieen.
Prings. Jahrb. für Wiss. Botanik, II. Plate XXI, figs. 38–41.
3. **de Wildeman, E.** 1895. Notes Mycologiques, VI.
Anns. Soc. Belge Microsc., XIX. Page 207.
4. **Saccardo, P. A., Peck, C. H.**, and **Trelease, W.** 1900–02.
Report of the Harriman Alaskan Expedition, Vol. V, p. 35.
5. **Ward, H. M.** 1883. Observations on the Genus Pythium (Pring.).
Quart. Jour. of Micros. Science, n. ser., XXIII. Plate XXXVI, figs. 37–39.
6. **Schenk, A.** 1859. Algologische Mittheilungen
Verhandl. d. phys. med. Gesel. in Würzburg, IX. p. 12, Plate I, figs. 1–6.

Cryptogamic Laboratory of Harvard University.

A NEW SPECIES OF APHANOCAPSA.

Anselm Maynard Keefe.

Early in August, 1926, Mr. H. K. Svenson of Union College, Schenectady, called my attention to a strange blue-green alga in a fresh water pond between Woods Hole and Falmouth, Massachusetts. The name of this body of water, "Salt Pond," is a misnomer and probably refers to its character at some previous time. At present a roadway and a stretch of sandy beach separate it from the salt water of Vineyard Sound.

Along the eastern shore of the pond in question were two or three areas of what proves to be a unique blue-green alga. The roots of the Blue Joint Grass, *Calamagrostis canadensis*, here resist the action of the water to such an extent that along the shore line are shaded nooks or pockets sometimes as much as a foot or two in diameter and about six inches deep.

Here, growing unattached to the bottom, occurred the alga in question. The young colonies are almost spherical, about the size of a pea; older colonies, however, are 3–4 inches in diameter and more or less compressed. The young colonies have a fairly firm texture but the more mature ones are extremely fragile and readily break up into fragments under the action of the waves. Individual cells are pale blue in color and vary from 0.7–1 μ in diameter. The gelatinous sheath of each cell is extremely hyaline and the sheaths are completely confluent with one another. Thus the whole colony forms a homogeneous gelatinous mass filled to its periphery with an immense number of minute spherical cells that lie at some distance from one another. This arrangement of the cells within the colony places it among the Aphanocapsas. The most interesting feature of the organism, however, is its size, the colonies attaining a larger diameter than has been previously reported for the genus.

The general characteristics of the individual cells seem to bring this alga close to the *A. delicatissima* of W. S. and G. S. West[1], which has been found in Wisconsin and elsewhere by G. M. Smith. Since *A. delicatissima* is a completely microscopic form, rarely if ever measuring more than 50 μ in the greatest dimension of its colonies, the enormous size of this colony would seem to warrant the assumption that it is a new species.

In this relationship, however, it is well to bear in mind G. M. Smith's pertinent observation regarding *A. delicatissima:* "The cells of this species are smaller than many bacteria. . . . When the colonies are of any considerable size the mass of cells has a decided blue-green color so that the organism must be considered a blue-green bacterium or a blue-green alga of bacterial size. The latter view seems to be the more logical. It is very probable that the bacteria have been derived from the blue-green algae and the Wests' discovery of blue-green algae of bacterial size is very suggestive."[2]

[1] Jour. Linn. Soc. Bot. **40**: 431. 1912.

[2] Phytoplankton of the Inland Lakes of Wisconsin. Wis. Geol. & Nat. Hist. Survey, No. 57: 41. 1920.

I have taken the liberty of naming this new algal species for Dr. Ivey F. Lewis of the University of Virginia, who has for many years directed the botanical instruction at the Marine Biological Laboratory Woods Hole, Mass.

Specimens of this form are being placed in the herbaria of the Marine Biological Laboratory, Wisconsin and Harvard Universities.

The following diagnosis is submitted:

Aphanocapsa Lewisii, sp. n. Strato magno, globoso vel elliptico compresso, inter saxos libere submerso; gelatinosa textura, hyalina subfirma; colore subolivaceo-viride, sicco fusco-viride; familiis usque ad 5 cm. latis, quorum majoribus vel aetate provectis vi undis franguntur et dissipantur; cellulis sphaericis, 0.7 ad 1 μ diam., densissime aggregatis, contentu pallide coeruleo. Loc. In aqua dulce, "Salt Pond" nuncupato, prope Falmouth, Mass.

For his kind assistance in placing this organism I am greatly indebted to Dr. G. M. Smith of Stanford University.

St. Norbert College, West Depere, Wisconsin.

STUDIES ON INTERIOR DISTRIBUTION OF MARITIME PLANTS,—I.

EFFECTS OF POST-PLEISTOCENE MARINE SUBMERGENCE IN EASTERN NORTH AMERICA.

H. K. Svenson.

Introduction.

The period of geological history since the Pleistocene glaciation has increasing significance, in large part due to the study in Europe of post-glacial plant migrations and plant remains. Similarly, in North America, as has been elaborated by Asa Gray, a partial destruction of vegetation during glacial times was followed by a northward migration of the flora when warm weather ensued. At the close of this last glacial period the Champlain submergence, a marine transgression into low-lying regions adjacent to the retreating ice, left its mark in the form of elevated beaches and fossiliferous clay deposits. Exact limits of this marine submergence are not known, but portions of the Maritime Provinces of Canada were inundated, marine sediments were deposited in river valleys of eastern New England, and Lake Champlain was occupied by an arm of the sea which extended through the St. Lawrence valley to the Great Lakes. In the past,

the effect of this marine submergence upon the flora of the Great Lakes has been the subject of extensive speculation, much of it unfortunately not sound, for during the nineteenth century the extent of this submergence was poorly understood. The writer has approached the subject from a modern aspect, and although no unusual results have been attained, feels that the present paper may serve as a basis for further accumulation of facts which will throw light on the complicated phytogeographic history of New England. The writer is especially indebted to Professor M. L. Fernald, under whose inspiration and guidance the work was attempted, and to the late Miss Mary A. Day, librarian of the Gray Herbarium; to the late Professor J. B. Woodworth and to Professor J. H. Stoller for information on geological matters; to Dr. S. F. Blake of the Department of Agriculture for critical notes on the Lake Champlain region, and to Professor R. E. Torrey for information and specimens from the region of Amherst, Massachusetts.

Historical Survey.

Although plants of a maritime nature were recorded by Pursh from the salt springs about Onondaga Lake as early as 1807, the first recorded connection between these plants and oceanic submergence was made by Torrey.[1] "It is remarkable," to quote Torrey, "that on the shores of the Great Lakes, there are certain plants, the proper station of which is the immediate neighborhood of the ocean, as if they constituted part of the early Flora of those regions, when the lakes were filled with salt water, and have survived the change that has taken place in the physical conditions of their soil. Among such species may be enumerated *Cakile maritima, Hudsonia tomentosa, Lathyrus maritimus,* and *Euphorbia polygonifolia.*"

Paine's brilliant catalogue of the plants of Oneida County followed in 1865,[2] noting with more detail the occurrence of plants of saline or maritime habitats in the interior of New York State, and forming a basis for the work of subsequent writers. Of the occurrence of *Juncus balticus* [var. *littoralis*] in the swamp at West Bergen Paine (p. 92) says, "This plant appears out of place here. Its usual habitat is the border of the Lake [Ontario]; while this station is three hundred feet or more above the level of the Lake, and nearly twenty miles

[1] Torrey, John. Fl. New York. 1843. p. vi.
[2] Paine, J. A. Regents' Rept. N. Y. State. 1865.

south of the shore and has been found still farther inland. Other shore plants accompany it; . . . all depend on the water of the Lake for their establishment. Their presence at the place, therefore, indicates that the surface of the water has been so much higher, or the land so much lower, at some time past. Furthermore, this is a seaside plant, native in the north of Europe and on our northern coast. For its introduction to the Great Lakes it is just as dependent on the ocean as are *Ranunculus Cymbalaria, Atriplex hastata, Salicornia herbacea, Naias major* [*N. marina*], *Ruppia maritima, Triglochin maritimum, J*[*uncus*] *bulbosus* [*J. Gerardi*], *Scirpus maritimus* [*S. campestris*, var. *paludosus*], and *Spartina stricta* [*S. alterniflora*] for their existence at Onondaga Lake, and *Lathyrus maritimus* on the beaches of Oneida Lake. These localities are all nearly on the same level, which must have been the shore of a maritime bay, during some ancient period. This period cannot have been less remote than the Post-tertiary, and may have been among the epochs of the Tertiary itself." In mentioning *Najas marina,* he writes (p. 138), "The presence of a plant of so well-established maritime character in a bay of a freshwater lake, is at once surprising and suspicious. But the mystery is easily cleared. The belt of Medina sandstone commencing just southwest of Utica, . . . extending through the western part of this county, southern Oswego, along the shore of Lake Ontario in northern Cayuga, Wayne, Monroe counties and westward, is everywhere saliferous, abounding in springs and wells from some of which salt was manufactured in old times."

In 1867 Drummond[1] listed the plants showing this peculiar seaboard and Great Lakes distribution, discussing at length the problems of their migration. "It has long been a fact familiar to American botanists that a number of strictly maritime plants are diffused along the shores of the Great Lakes, in the immediate vicinity of some smaller lakes, and extensive swamps, situated a short distance away, and near salt springs in New York State and Wisconsin. The number of these has been, within the last two years, slightly increased. The Rev. Mr. Paine and Judge Clinton, have detected *Naias major* All., *Ruppia maritima* Linn., and *Leptochloa fascicularis* Gray—a perhaps sub-maritime species [the Onondaga plant is the maritime *Diplachne maritima* Bicknell]—near the margin of the Onondaga Lake, in New

[1] Drummond, A. T. The distribution of plants in Canada in some of its relations to physical and past geological conditions. Can. Nat., n. s., 3: 161–177. 1867.

York State, and Canadian botanists, although they have not added to this section of their lake shore flora, have yet thrown some further light upon its distribution. The brief catalogue hereunder, probably includes all the maritime plants, with one or more, perhaps, strictly submaritime species, now known to have this peculiar range.

Ranunculus Cymbalaria Pursh.
Cakile Americana Nutt.
Hudsonia ericoides Linn.
Hudsonia tomentosa Nutt.
Hibiscus moscheutos Linn.
Lathyrus maritimus Bigel.
Atriplex hastata Linn.
Salicornia herbacea Linn.
Polygonum aviculare Linn. var. *littorale* Link.
Hordeum jubatum Linn.
Polygonum articulatum Linn.
Rumex maritimus Linn.
Euphorbia polygonifolia Linn.
Naias major All.
Ruppia maritima Linn.
Triglochin maritimum Linn.
Triglochin palustre Linn.
Scirpus maritimus Linn.
Leptochloa fascicularis Gray. [= *Diplachne maritima* Bicknell].
Calamagrostis arenaria Roth. [= *Ammophila breviligulata* Fernald]

"It is to be observed that some of these plants have a very extended inland range, whilst others are apparently distributed over very limited areas. *Hudsonia tomentosa, Lathyrus maritimus,* and *Triglochin maritimum* are, perhaps, the most widely diffused.

"If, however, I am correct in referring the origin of the distribution of the inland maritime flora to the post-pliocene epoch, it will furnish an argument for the maritime character of such deposits as are coeval with those of the eastern sections of the province referable to this epoch. If the Great Lakes were in these distant and yet comparatively recent times, bodies of salt water, or if they were united into one vast inland sea, as, judging from geological evidence, was probably the case, we can readily account for the migration of the sea-shore species along the coasts. . . . As year followed year, and the lakes became imperceptibly more fresh, successive individuals of some of the species would, as it were insensibly, become reconciled to the new conditions. . . . It is further to be observed that the greatest number of species exist around, or at smaller sheets of water, not far from the shores of Lake Ontario, the Lake which, of all our inland freshwater seas, is much the nearest to, in fact, almost adjoins what formed in post-pliocene times, the ocean coast, and to the shores of which the first migration of sea-shore plants was probably effected."

Hitchcock[1] came to the conclusion that if these so-called mari-

[1] Hitchcock, C. H. The Distribution of Maritime Plants in North America. A Proof of Oceanic Submergence in the Champlain Period. Proc. Am. Assoc. **19**: 175–181. 1870.

time plants depended upon the ocean for their distribution, then the sea in the Champlain period must have penetrated the continent as far as Minnesota. A list of seventy-nine species with geographical distribution is enumerated. Hitchcock reports from Lake Champlain three types, *Hudsonia tomentosa* [a species of sands of the coast and inland to the Great Lakes], *Scirpus Olneyi* [apparently an error in determination], and *Hordeum jubatum* [this is preceded by a question mark, indicating doubt as to whether it should be classed as a maritime plant]. "From molluscan remains it is proved that the Hudson and Champlain valleys were covered by salt water in the period now under consideration. The proof of submergence, from the occurrence of maritime plants, is very meagre, only four species appearing on the list. The only Hudson River representative is *Salsola Kali.* It is possible that future researches may add to the list. It may likewise be observed that the Lower St. Lawrence furnishes fewer species than the borders of the Great Lakes. Is it not possible that these breaks in the connection are proofs of the correctness of our theory? If the continued existence of these plants about the lake is due to the presence of large bodies of water, even in the absence of salt, then we should not expect to find them remaining along the narrow Champlain, nor the still narrower Hudson River, nor, to a large extent, the St. Lawrence. The conditions are not favorable to their preservation."

In the "Geology of New Hampshire" Hitchcock[1] again reviewed the relation of plant distribution to marine submergence, and added to it the possibility of marine submergence of the Lake Winnepesauke region, from the presence there of such typically marine fish as the salmon and smelt. Hitchcock, essentially a geologist, derived his botanical information from Paine, Porter, Lapham, and other botanists of his time.

Finally Drummond[2] under the title, "The Distribution of some Canadian Plants, an Argument for the Marine Origin of the Erie Clays" attempted to correlate the presence of arctic plants in the Lake Superior region with the marine submergence, concluding that the boreal and semi-arctic plants of the Lake Superior coasts probably migrated there with or prior to the maritime plants.

All these discussions, however, belong to that period of American

[1] Hitchcock, C. H. Geol. N. H. 1: 564–568, 1874.
[2] Can. Nat. n. s. 7: 217–223. 1874.

geological history in which the Glacial Theory was becoming established, during which the water-laid deposits were considered as of marine rather than fluviatile or lacustrine origin. Toward the close of the nineteenth century the marine deposits were seen to be of limited extent, the name "Champlain" being derived from their characteristic occurrence about the region of Lake Champlain.

The Champlain Submergence.

The term "Champlain," to some extent the subject of geological controversy, is used in the present paper to signify the period of marine submergence following closely upon the retreating ice of the last stage of the Pleistocene glaciation. The early controversies as to the origin of the glacial drift, to which period the foregoing discussions on maritime plants really belong, are here omitted, and the literature which is cited is noted only with the view of establishing the proximal limits of marine submergence. No review is made of the supposed recent submergence along the northern Atlantic coast.[1] Since the literature is so abundant and bibliographies are present in nearly all the larger works, only a few contributions to the subject are mentioned.

As a general treatment may be mentioned the work of DeGeer[2] in 1892. Isobases show points of equal submergence in eastern Canada and New England. The Champlain Sea extends through the Hudson valley, making New England and the Maritime Provinces in conformity with earlier views an island surrounded by salt water.

In a more recent general account Upham[3] states, "That the land northward from Boston was lower than now while the ice-sheet was being melted away is proved by the occurrence of fossil molluscs of far northern range, including *Yoldia* (*Leda*) *arctica* Gray, which is now found living only in the Arctic seas, preferring localities that receive muddy streams from glaciers and from the Greenland ice-sheet. This species is plentiful in the stratified clays resting on the

[1] For a detailed account see J. W. Goldthwaite: Supposed Evidences of Subsidence of the Coast of New Brunswick within Modern Time. Can. Dept. Mines, Museum Bull. **2**: 45–67. 1914, and H. H. Bartlett: The Submarine Chamaecyparis Bog at Woods Hole, Massachusetts. Rhodora **11**: 221–235. 1909.

[2] DeGeer, G. On Pleistocene Changes of Level in North America. Proc. Bost. Soc. Nat. Hist. **25**: 454–477. 1892. For a modified copy of DeGeer's map see Rhodora **13**: pl. 91 (opp. page 142). 1911.

[3] Upham, Warren. Stages of the Ice age. Bull. Geol. Soc. Am. **33**: 491–514. 1922. The Champlain Stage. p. 510–512.

till in the Saint Lawrence Valley and in New Brunswick and Maine, extending southward to Portsmouth, New Hampshire. But it is known that the land was elevated from this depression to about its present height before the sea here became warm and before the southern molluscs, which exist as colonies in the Gulf of Saint Lawrence, migrated thither, for these southern species are not included in the extensive lists of the fossil fauna in the beds overlying the till.

"In the Saint Lawrence Valley the marine deposits reach the southern end of Lake Champlain, whence the beds and this stage ending the Ice Age are named, to Ogdensburg and Brockville, and at least to Pembroke and Allumette Island, in the Ottawa River, about 75 miles above the city of Ottawa. The isthmus of Chignecto, connecting Nova Scotia with New Brunswick, was submerged, and the sea extended 50 to 100 miles up the valleys of the chief rivers of Maine and New Brunswick. The uplift from the Champlain sea-level was 10 to 24 feet in the vicinity of Boston and northeastward to Cape Ann; about 150 feet near Portsmouth, New Hampshire; from 150 to about 300 feet along the coast of Maine and southern New Brunswick; about 40 feet on the northwestern shore of Nova Scotia, thence increasing westward to 200 feet in the Bay of Chaleurs, and about 560 feet at Montreal; 150 to 400 or 500 feet, increasing from south to north, along the basin of Lake Champlain; about 275 feet at Ogdensburg, and 450 feet near Ottawa. The differential elevation was practically completed, as we have seen from the boreal character of the Champlain marine molluscan fauna, shortly after the departure of the ice-sheet."

Eastern New England.—To consider the subject in more detail, the zero isobase undoubtedly occurs in the immediate vicinity of Boston, reaching the height of eighty feet in the elevated sea beaches of Cape Ann,[1] and to about 200 feet in the vicinity of Portland, Maine. The isobases run parallel to the coast of Maine, beach levels increasing as one goes inland. Stone[2] gives the following approximate heights to which the sea could have advanced in river valleys of Maine: Saco, 200–250 feet; Presumscot, 250–260 feet; Little Androscoggin, 400 feet; Androscoggin at Livermore Falls, 375 feet; Sandy River at

[1] Woodworth, J. B. Note on the elevated beaches of Cape Ann, Massachusetts. Bull. Mus. Comp. Zool. (Cambridge) 42: 191–194. 1903.

[2] Stone, G. H. The Glacial Gravels of Maine. Monograph 34: U. S. Geol. Surv., p. 484. 1899. This work also contains a preliminary map of the marine clays of Maine.

Farmington, 440 feet; Kennebec at Bingham, 450–500 feet. The actual heights are probably somewhat less than these.

In correlating the stages of the glacial period, Clapp[1] describes the Leda clays as extending through the St. Lawrence valley and south along the coast as far as Boston. Although the clays at Cambridge, Revere, and Lynn, and other places near Boston do not contain fossils, they probably belong to this class. "In New Hampshire they are finely developed. . . . In Maine they extend along the coast from Kittery to Eastport, forming many low plains near the sea and extending up most of the river valleys. In York County they extend fifteen miles or more from the coast. In the valley of the Presumscot River they are found nearly to Sebago Lake. . . . Farther north similar clays occur at higher elevations as far as Sandy River at Farmington; but the clays above Skowhegan may possibly not be marine as fossils have not been reported in them. The marine clays are abundant along Sheepscot River in Lincoln County, and are widely distributed in the vicinity of Rockland, Knox County. They extend up the Penobscot to beyond Oldtown."

(To be continued.)

Rehder's Manual of Cultivated Trees and Shrubs[2]—Rehder's *Manual* is going to be one of the most frequently consulted reference-books. It is a handsome compendium of all the trees and shrubs which have been or are likely to be cultivated in temperate North America. Consequently, bringing together in compact form descriptions and keys covering woody plants of many geographic regions, it is bound to be as indispensable to the working botanist as to the cultivator of trees and shrubs. Every student of plants is faced, especially in the neighborhood of cities and parks, with the difficulty of quickly identifying many of the planted species. This difficulty is now removed. Comparison with Sargent's *Manual* of the native trees of the same area makes the importance of Rehder's book apparent. Thus Sargent describes 9 species and 1 variety under *Abies;* Rehder has 38 species and more than 30 varieties. In *Betula* Sargent has 10 species and 1 variety; Rehder has 38 species, 27 varieties and many hybrids. In *Fraxinus* Sargent has 16 species; Rehder 42 species and 35 varieties; and so on through hundreds of genera; and, of course, the shrubby genera (even down to such diminutives as *Chimaphila*) are not included by Sargent.

[1] Clapp, F. G. Complexity of the Glacial Period in New England. Bull. Geol. Soc. Am. **18**: 505–556. 1908.

[2] Alfred Rehder. *Manual of Cultivated Trees and Shrubs Hardy in North America.* 930 pp. New York. The Macmillan Co. 1927.

The book, naturally, is worked out on the lines already familiar in Rehder's prolific publications. Both generic and specific segregation often go farther than some systematists will be inclined to follow; but in other cases the treatments are refreshingly conservative. To illustrate these points: Rehder maintains *Xolisma* as a genus distinct from *Pieris* because he finds that in the species he treats as *Xolisma* the anthers are not awned, while in *Pieris* they have reflexed awns; but, as Matthews and Knox[1], after a detailed study of many species, assert, "the distinction between filamentous and antherine appendages, as employed by Rehder, has no real existence. . . . as generic characters between *Pieris* and *Xolisma* they have no real value."[1] On the other hand, following the most conservative systematists, Rehder keeps *Vaccinium* intact (including *Batodendron, Vitis-Idaea* and *Oxycoccus* along with § *Euvaccinium* and § *Cyanococcus*). In other words, the book very definitely represents Rehder's own views and other botanists may not at once accept all his decisions.

In nomenclature the author follows in general the International Rules, so that most of the generic names agree with those used in Bailey's *Standard Cyclopedia of Horticulture* and his *Manual* and in the 7th edition of Gray's *Manual*. A noteworthy departure "is the use of the term 'var.' for any subdivision below the species, regardless whether it was originally described as subspecies, varietas, forma, lusus, etc. In monographs and similar taxonomic publications it is no doubt desirable, and in the case of polymorphic species often necessary, to distinguish subdivisions of different rank and subordinate to each other, but for the designation of any form below the species, three names should be sufficient. . . . Double citation is not employed in this book; this is often used to indicate that in a combination of names the name of the species or variety did not originate with the author, but was taken from an older combination. . . . Though double citation indicates that a species or variety had been described before, it makes no difference in regard to the responsibility for the accepted combination. . . . As the authority of varietal names the author who first placed the name under the correct and accepted binomial . . . is cited, regardless whether he published it as a subspecies, variety, forma, lusus, etc."

It is unfortunate for a professed follower of the International Rules thus to violate the Rules; but it is still more to be regretted that a tremendous misrepresentation of values and of facts and a needless and far-reaching confusion in nomenclature should thus be promulgated. Surely, a single freaky clump with dissected foliage or an albino (legitimate formae) are not of the same taxonomic importance as a constant and wide-ranging plant which has consistent subspecific or varietal characters as well as an individual range. Yet by Rehder's merging of the lesser categories the taxonomic

[1] Matthews & Knox, *The Comparative Morphology of the Stamen in the Ericaceae*. Trans. and Proc. Bot. Soc. Edinb. xxix. 258 (1926).

values are completely confused. One illustration will suffice. *Betula nana*, var. *Michauxii* so far differs from *B. nana* as to have been separated by Opiz as a monotypic genus, *Apterocaryon;* and it is the only representative of the Eurasian *B. nana* in North America (except in Greenland and perhaps arctic Alaska). *Alnus incana*, forma *tomophylla* Fern. was based on a single eccentric clump of our common alder with "cut" leaves. Taxonomically and geographically it is almost negligible; yet, treated by Rehder as "var. *tomophylla* Fern." it is fallaciously raised to a rank equivalent to that of *Apterocaryon* or *Betula Michauxii* or *B. nana*, var. *Michauxii*. This sort of thing may be convenient, but it cannot appeal to most systematists. Not only are profound scientific facts distorted in such cases, but by the citation of the author of *Alnus incana*, forma *tomophylla* as the author of the variety, another perversion of the actual fact occurs. The authors of VAR. *tomophylla* are, of course, (Fern.) Rehder; and one cannot but wonder at the reasoning of an author who under the specific combinations rejects the parenthetical authority, but in case of all names under the species cites, when the category has been altered, only the parenthetical authority (without parenthesis). The amount of checking by botanical users of the book necessary to determine the correct authors of the thousands of so-called varieties is appalling!

In one other matter it is hoped that in a future issue the author will find it possible to make the book more satisfactory. This is the statement of natural ranges. For purely horticultural purposes the natural range of the species may be unimportant; but, when a range is stated, it is not too much to wish that it should be broadly correct. *Betula nana*, var. *Michauxii* may again serve as an illustration of my point. Rehder limits it exclusively to "Lab[rador]." But, when it was originally published, as *B. Michauxii* Spach, Spach distinctly gave its range: "America borealis et insula Terrae Novae," and there are certainly plenty of Newfoundland specimens in the herbarium of the Arnold Arboretum. Again, *Dryas Drummondii* was cited by Torrey & Gray (1840) from Anticosti and it has repeatedly been collected and listed from there, the Gaspé Peninsula and the Mingan Islands, all in Quebec (noted from Quebec 15 times in the volumes of RHODORA), and it is included in both editions of Britton & Brown. There are good specimens of it from Quebec at the Arnold Arboretum; consequently Rehder's restriction of its range to "Arct. Am. s. to Mont." is difficult to understand. (Incidentally, the species is unknown in Arctic America). Again, after Rehder & Wilson had described from China and northwestern America *Arctous alpina*, var. *rubra* it was pointed out[1] in this journal that the characters relied upon to separate *Arctous* from *Arctostaphylos* were not stable and that *Arctous alpina*, var. *rubra* occurs not only in China and northwestern America, but in western Siberia and in

[1] RHODORA, xvi. 21–33 (1914).

eastern Quebec; and it has subsequently been collected in and reported from Newfoundland. The author of the new *Manual* surely knew of the discussion above cited, and it is unfortunate that in the statement of range of *Arctous ruber* all mention of eastern North America should be omitted.

These matters in which many botanists will not agree with the author of the *Manual* are such as are likely to find expression in the work of any individual author, particularly if his viewpoint is that acquired from working with specially selected and often too sharply contrasted representatives in a museum or a living collection. In the nursery the minor forms are often more interesting than the true geographic varieties and subspecies and even than distinct species; but from a taxonomic and phytogeographic standpoint, they are only of minor interest and their elevation to superior rank is misleading. In spite of these somewhat academic criticisms, it should again be emphasized, however, that Rehder's book is one which will be needed by every working botanist. To the nurseryman, horticulturist and amateur gardener it will be indispensable.—M. L. Fernald, Gray Herbarium.

The Date-palm as a ruderal Plant in Massachusetts.—Like all growing cities, Worcester, Mass. maintains a number of dumping grounds. While crossing one of these on Sept. 13, 1915, the writer noticed a number of peculiar-looking plants growing all about. On digging up several of the plants, the unmistakable stone of the Date-palm (*Phoenix dactylifera* L.) was found, still attached to the seedlings.

These seedlings consisted of two erect, rigid, narrow, strongly-veined leaves, growing from an underground stem. The longer of the leaves were from 3 to 9 inches in length; the underground stems were two or more inches in length; and the white root system, striking deep into the ashes which composed the dump, were 4 or more inches long. The roots all broke before they could be traced to their ends. The characteristic date-stone was connected to the lower end of the stem at about the middle of the inner or grooved side.

These plants have been collected by the writer in 1915, 1916, 1921, 1923 (twice), 1925 and 1926. The original stand contained about 50 plants; these have materially diminished since then. The past summer, which was neither very hot nor wet, brought out less than a dozen plants. In drying the leaves roll very closely lengthwise, break off and disappear during the winter.

The recurrence of this unusual species here is a problem. The possibility of new stones being added in successive seasons, is discounted by the fact that the edge of the dump has been pushed out into the swamp some 100 feet or more, and that no new material has been thrown off on the old part of the dump for several years. The date-stones may have been left with other refuse from the fruit-stands of our foreign population; and naturally slow growth and retarded germination may have followed.

By a strange coincidence, a single plant of the Wild Tobacco (*Nicotiana rustica* L.) was found with the big colony of the Date-palms in 1921; while on a dump a mile away a flourishing colony of Wild Tobacco was recorded in 1912 (Rhodora, Oct., 1912) and in 1923 this dump produced a dozen Date-palm seedlings for a single year.—Norman P. Woodward, Worcester, Massachusetts.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 29. April, 1927. No. 340.

THE HEPATICA TRANSSILVANICA GROUP OF EASTERN EUROPE AND ASIA.

Albert N. Steward.

In studying the species of *Ranunculaceae* which occur in Eastern and Central China, the writer found at the Gray Herbarium a specimen collected by Dr. Augustine Henry in Hupeh Province and described as *Anemone* (*Hepatica*) *Henryi* Oliver (1). The section *Hepatica* of the old genus *Anemone* has been recently re-accepted as a valid genus by many botanists, so the question arose of finding a valid name for this plant, if it should prove to be clearly separable from others of the group which bear earlier descriptions.

The investigation of this matter brings to light some interesting opinions concerning the species most closely related to this plant. There seem to be three species of Eastern Europe and Asia separated from others by a constant character of mucronately or mucronulately lobed leaves. These are *H. transsilvanica* Fuss (2), *Anemone Falconeri* Thomson (3), and *A. Henryi* Oliver mentioned above.

Finet and Gagnepain (4) do not recognize the genus *Hepatica*. They reduce *Anemone Henryi* and *A. transylvanica* (a synonym for *Hepatica transsilvanica*) to *A. hepatica* var. *transylvanica*. Ulbrich (5) collects *A. transylvanica*, *A. Henryi* and *A. Falconeri* into *A. angulosa* (non Lamrck.).

These, however, appear to be clearly distinguishable species. Therefore the names **Hepatica Henryi** (Oliver) [= *Anemone Henryi* Oliver] and **Hepatica Falconeri** (Thomson) [= *Anemone Falconeri* Thomson] are here presented as new combinations. In connection with the last named of these, it should be pointed out that the author

of the original description recognized that, "This little plant appears to be intermediate between the genus *Hepatica*, which has a sessile flower and the *Anemonanthea* section of *Anemone*, which has divided involucral leaves and muticous achenia." (3)

The distinguishing characters of these species are:

Flowers projected above the involucre on a short pedicel (about 8 mm. long) . . . . *H. Falconeri*
Flowers sessile on and closely subtended by the involucre.
- Leaves deeply cleft (to the middle or beyond), 5–8 cm. in diameter, rather coarse in texture; mature petioles 8–20 cm. long, sparsely appressed-pubescent: flowers 3–4 cm. in diameter . . . . *H. transsilvanica*
- Leaves shallowly lobed (not more than ⅓ of way to base), 3–5 cm. in diameter, thinner in texture; mature petioles 5–10 cm. long, shaggy-villous: flowers 1–2 cm. in diameter, yellow (from description) . . . . *H. Henryi*

References.

(1) Hooker's Icones Plantarum xvi. t. 1570. (1887.)

(2) Verhandlungen und Mittheilungen des Siebenbürgischen Vereins fur Naturwissenschaften zu Hermannstadt i. 83. (1850.)

(3) Hooker's Icones Plantarum ix. t. 899. (1852.)

(4) Bulletin de la Société Botanique de France li. 66. (1904.)

(5) Engler's Botanische Jahrbücher xxxvii. 190, 271–272. (1905.)

Gray Herbarium.

INTERESTING PLANTS OF NORTHERN LABRADOR.

R. H. Woodworth.

A scientific expedition, planned and commanded by Columbus O'D. Iselin, spent the summer of 1926 working in the region of northernmost Labrador. The expedition was mainly one of oceanography. The writer was most fortunate to be invited to join the party in order to collect plants for the Gray Herbarium whenever the opportunity presented itself. Difficulties in drying specimens were met with on account of the usual dampness of a sailing vessel together with an unusually damp season. The use of flaked napthalene sprinkled upon the specimens before they were packed away was a decided aid in drying. Collections were made from fourteen stations, four of which are in the vicinity of regions of previous collections.

The plants have been identified at the Gray Herbarium, Harvard

University, under the direction of Prof. M. L. Fernald. In general they have appeared to be typical arctic plants, which have heretofore been brought back from Labrador. Some of the species, however, are worthy of note.

Dupontia micrantha Holm. On gravelly sea beaches; Ryan's Bay and Ekortiarsuk Bay.

Originally described from northern Labrador and shores of Hudson Bay. The species is apparently of wide arctic range, since material from Spitzbergen (*T. M. Fries*, August, 1868) belongs here rather than with *D. psilosantha*, with which it was originally identified.

Trisetum spicatum (L.) Richter. On alluvial terraces; Ryan's Bay.

First collection from south of Ellesmereland of the typical arctic and Eurasian plant. When Fernald revised the eastern American variations of the species[1] he stated that this typical form with very dense violet or bronze obovoid panicle was unknown in America south of the Arctic.

T. spicatum, var. Maidenii (Gandoger) Fernald. On alluvial terraces; Sandwich Bay, Saglek Bay, Nachvak Bay, Ryan's Bay, Ekortiarsuk Bay.

T. spicatum var. pilosiglume Fernald. On alluvial terraces; Nachvak Bay. This and the preceding variety were already known from Labrador.

Deschampsia alpina (L.) R. & S. On sandy river bank; Ryan's Bay. An arctic-alpine species of Eurasia, already known from Greenland but not previously from North America.

Kobresia Bellardii (All.) Degland. On granitic hillsides; Nachvak Bay and Ryan's Bay. An arctic-alpine species not previously known in eastern America from south of Ellesmereland.

Carex bipartita All. On alluvial terraces; Ryan's Bay. Not definitely recorded from Labrador but collected by Sornborger at Rama (no. 256) and distributed as *C. glareosa* Wahlenb.

C. trisperma Dewey. In sphagnum bog; Sandwich Bay. A slight extension to the northeast; the species already known from along the Straits of Belle Isle.

C. Halleri Gunn. On alluvial terraces; Ryan's Bay. Heretofore known in Labrador only from the Straits of Belle Isle (Blanc Sablon, *Fernald & Wiegand*, no. 2852).

[1] Fernald, *The Representatives of Trisetum spicatum in eastern America.* Rhodora, xviii. 195–198 (1916).

Juncus biglumis L. On rocky hillside; Ekortiarsuk Bay. First collection from south of Baffinland.

J. brevicaudatus (Engelm.) Fernald. On sandy river bank; Sandwich Bay. A slight extension to the northeast, from the Straits of Belle Isle.

Luzula campestris, var. alpina Gaud. On rocky hillside; Ekortiarsuk Bay. Heretofore known in North America only from the northwest shore of Hudson Bay and from the Shickskock Mts. of Quebec.

Iris versicolor L. On sandy river bank; Sandwich Bay. A slight extension northeastward from the Straits of Belle Isle.

Salix anglorum Cham., var. kophophylla Schneider. On rocky hillsides; Saglek Bay, Nachvak Bay. New to Labrador. Previously known only from Newfoundland and eastern Quebec.

S. Bebbiana Sarg., var. perrostrata (Rydb.) Schneider. On rocky river bank; Sandwich Bay. Northeastern extension from northern Newfoundland and Saguenay Co., Quebec.

Betula papyrifera Marsh., var. cordifolia (Regel) Fernald. On sandy alluvial bank; Sandwich Bay. Northeastern extension from northern Newfoundland and Saguenay Co., Quebec. The trees had cherry-red bark.

Cochlearia groenlandica L., var. oblongifolia (DC.) Lange. On gravelly alluvial terraces; Saglek Bay and Ryan's Bay. The material from northern Labrador is a good match for authentic Greenland specimens.

Saxifraga gaspensis Fernald. On rocky hillside; Nachvak Bay. This species has heretofore been known only from the Shickshock Mts. of the Gaspé Peninsula, Quebec.

Antennaria pygmaea Fernald. On rocky hillsides; Nachvak Bay and Ryan's Bay. Specimens larger than previous collections, reaching a full decimeter in height; occasionally with 2–3 heads.

A. Sornborgeri Fernald. On rocky hillsides; Ryan's Bay and Ekortiarsuk Bay. Previously known only from Rama. The species strongly contrasting in the field with the common *A. alpina* on account of its rigid habit.

A. isolepis Greene. On damp rocky hillsides; Nachvak Bay and Ryan's Bay. The involucres tend to be greenish rather than white, as in earlier collections. The species is quickly recognized in the field on account of its flaccid flowering stems.

PETASITES TRIGONOPHYLLA Greene. River-delta; Nachvak Bay. New to Labrador. Heretofore known in eastern America only on the Shickshock Mts. of the Gaspé Peninsula and on Anticosti Island.

HARVARD UNIVERSITY.

EFFECTS OF POST-PLEISTOCENE MARINE SUBMERGENCE IN EASTERN NORTH AMERICA.

H. K. SVENSON.

(*Continued from p. 48.*)

CANADA.—In New Brunswick, Chalmers[1] shows the presence of marine deposits across the isthmus of Chignecto, throughout the valley of the Kennebecasis River, and extensively along the Mirimichi River. The deposits are confined to the coastal areas and river estuaries. In the upper St. John Valley, the terraces and clays are of lacustrine origin. "In the region along the south side of the St. Lawrence, below Rivière du Loup, there has been a subsidence of from 345 to 375 feet with reference to the present sea level in the Post-tertiary period. Above the 375 feet contour line, no evidence of submergence was seen."[2]

Johnston[3] finds it impracticable definitely to trace the northern boundary of the Champlain Sea at its maximum height in the Ottawa valley because of weakness of development of the highest shore-line and because of the character of the rocky upland area, but shows that, in general, the northern boundary lay along the face of the Laurentian Plateau escarpment, roughly parallel to the Ottawa River. The sea extended far up the Ottawa valley, possibly as far as the head of Lake Temiskaming. "The southwestern margin of the sea has not been traced, but it is known from the altitudes of the raised beaches and from the distribution of the marine sediments that it was bounded, approximately, by the eastern border of the Pre-Cambrian upland area in south-central Ontario. At the highest stage of marine submergence, the portion of the triangular area between the Ottawa and St. Lawrence rivers, lying east of a line

[1] See Surface-geology maps accompanying Canadian Geol. Surv., 1885 to 1888, also Ann. Rept. 1885: 40 gg.

[2] Can. Geol. Surv. Ann. Rept. 1886: 8M.

[3] Johnston, W. A. Late Pleistocene Oscillations of Sea-Level in the Ottawa Valley. Can. Dept. of Mines. Mus. Bull. 24: 1916.

drawn from Ottawa to Brockville, was entirely submerged except for a few isolated hills. It has long been known that the upper as well as the lower portion of the St. Lawrence valley was also submerged, and that the level of the marine waters extended westward into the Ontario basin. In the upper St. Lawrence valley, however, the submergence was not so great as in the Ottawa valley; for the Ottawa valley lies at a lower level and was depressed to a greater extent, as shown by the higher altitudes of its marine deposits." The Champlain Sea at the time of its greatest extent occupied practically the same extent in New York as did the glacial Lake Iroquois.[1]

As previously mentioned, Hitchcock postulated the extent of oceanic submergence "as far as Minnesota." This question seems to be settled in a recent publication by Baker,[2] from which the following quotation comes. "The finding of marine fossils in the fields near Chicago Lawn raised a serious question as to their origin. The presence of certain crustacea (*Mysis*) in the lake as well as of such plants as the beach pea (*Lathyrus maritimus*), the beach plum (*Prunus maritima*) and the seaside spurge (*Euphorbia polygonifolia*) has led several writers to the conclusion that the waters of Lake Michigan were once salt. The presence of these plants and crustaceans are, however, not sufficient on which to build a theory of this kind. At first sight it might be thought that the fossil shells . . . offer indubitable evidence of the presence of marine waters at this stage of postglacial history. The species recorded are all of southern distribution, living plentifully in the Gulf of Mexico or the waters of the southern and eastern coast of the United States. Therefore the incursion of the sea must have been from the south by the way of the Mississippi Valley and not from the northeast by way of the St. Lawrence Valley. If there was such an incursion, there should certainly be evidences in the territory lying to the south of the area in question; but no evidence has been found which would support such a contention." "It seems quite evident from subsequent study, that all these marine shells were artificially introduced by man. The presence of certain marine crustaceans in the Great Lakes has suggested the possible occupancy of the lake basin by marine waters. These organisms, however, easily accustom themselves to fresh water

[1] Mather, K. F. The Champlain Sea in the Lake Ontario Basin. Journ. Geol. **25**: 542–554. 1917.

[2] Baker, F. C. The Life of the Pleistocene or Glacial Period. Univ. Illinois Bull. vol. **17**: no. 41. p. 14. 1920.

and it is quite probable, if not certain, that they entered the lakes by way of the North Bay outlet, via the Ottawa River, during the Champlain submergence. The low temperature of the glacial waters would enable these creatures to become gradually accustomed to fresh water."

CHAMPLAIN VALLEY AND HUDSON RIVER.—Earlier writers assumed the presence of marine deposits in the upper valley of the Hudson, and a sheet of salt water connecting Lake Champlain and the ocean at New York. This view is still maintained by Fairchild. Woodworth,[1] however, believes that the Champlain Sea did not extend south of Whitehall, N. Y., approximately the southern limit of the present Lake Champlain. A recent paper by Miss Goldring has appeared in relation to the salinity of the Champlain Sea.[2] I quote from this as follows: "No fossils have been reported from the Pleistocene deposits south of Croton Point, either from the New York or New Jersey shores. The most northern point at which Pleistocene fossils have been reported from the Hudson Valley is at Storm King, fifty miles above New York. . . . The laminated character of the Hudson Valley clays, seen as far south as Haverstraw, and the absence of this peculiar laminated character in any of the localities in the Champlain area where marine fossils were found verifies what has already been indicated by the distribution and character of the fauna of these areas: (1) that the Pleistocene waters of the Hudson Valley were fresh or practically fresh north of the Storm King; (2) that the Champlain Sea extended southward in a brackish condition, gradually freshened, to a point a few miles south of Crown Point station, and that south of this area its waters were fresh or practically fresh."

Stoller[3] also arrives at a similar conclusion "that at no time was there a continuous body of marine waters connecting the Saint Lawrence arm of the sea with the ocean at New York."

Turning to southern New England, the elevation of the Housatonic valley precludes any oceanic submergence during the Champlain

[1] Woodworth, J. B. Ancient Water Levels of the Champlain and Hudson Valleys. N. Y. State Museum Bull. **84**: 224. 1905.

[2] Goldring, Winifred. Decreased salinity of the Pleistocene Champlain sea going southward. Bull. Geol. Soc. Am. **32**: 132–133. 1921. Abstract, also The Champlain Sea. N. Y. State Museum Bull. **239, 240**. 1922.

[3] Stoller, J. H. Late Pleistocene History of the Lower Mohawk Valley. Bull. Geol. Soc. Am. **33**: 515–516. 1922.

Period, except at the very mouth of the river. Hitchcock[1] conceived "that salt water extended up the several rivers, including the Connecticut, certainly as high as 500 feet, and probably higher." Estuarine conditions in the Connecticut valley were thought by Fairchild[2] to have extended as far as St. Johnsbury, Vermont, but recent work by Antevs[3] shows conclusively that southern New England was not submerged at this time, no traces of marine submergence being found in the Connecticut valley.

From a strictly botanical viewpoint the foregoing survey may seem extensive, yet it serves to bring together isolated material upon which the phytogeographic treatment must rest. In conclusion it is seen that while the Post-Pleistocene marine sea covered large areas in the St. Lawrence and Champlain valleys, depositing in them marine clays and sands, the saline waters were absent from the Great Lakes west of Lake Ontario, from most of the Hudson valley, from southern New England and the Connecticut valley, and from the St. John valley in New Brunswick.

Plant Distribution in Relation to the Marine Submergence.

In a study of the vegetation of New England one is impressed by the fact that certain plants characteristic of maritime beaches and brackish habitats along the coast frequently ascend the river valleys of New England and often occur abundantly in the region of Lake Champlain and the lowlands surrounding Lake Ontario—plants such as *Typha angustifolia*, *Zannichellia palustris*, *Potamogeton pectinatus*, *Phragmites communis* and *Lathyrus maritimus*. Thus Blake[4] writes of *Atriplex patula* var. *littoralis* from Lake Champlain "a plant of coastal and Great Lake range with us, now proving to occur also in the Champlain Valley like *Ammophila arenaria*, *Lathyrus maritimus*, and *Artemisia caudata*." Similarly in the upper St. John valley are *Triglochin palustris* and *Juncus balticus* var. *littoralis*, species ordinarily of brackish coasts in New England and the Mari-

[1] Hitchcock, C. H. The Champlain Deposits of Northern Vermont. Vt. Geol. Survey. 1906. 236–253.

[2] Fairchild, H. L. Pleistocene Marine Submergence of the Connecticut and Hudson Valleys. Bull. Geol. Soc. Am. **25**: 219–242. 1914, also Bull. N. Y. State Museum **209**, **210**. 1919.

[3] Antevs, Ernst. The Recession of the Last Ice Sheet in New England. Am. Geog. Soc. Research Series. no. **11**: 1922.

[4] Rhodora, **16**: 39. 1914.

time Provinces. *Hibiscus Moscheutos* and *Iris prismatica,* characteristic at the edges of salt marshes live inland; the former in river valleys above high tide, as in the Charles and Concord Rivers in eastern Massachusetts, the latter of more general distribution, but confined to the region of the coast. The distribution of the *Lemnaceae* is striking. These small aquatics grow luxuriantly in brackish ponds along the coast of southern New England, extending inland at low elevations in eastern Massachusetts, are almost entirely absent from Maine, but appear in abundance in the clays of northern Nova Scotia, from King's County to Cape Breton, extending through Prince Edward Island and the Magdalen Islands to the coast of Labrador. They occur also in the Champlain and Ottawa regions, along the Hudson River, and to the westward. With such a wide distribution—from South America to the Labrador Coast—it does not seem that temperature could be the primary limiting factor. A similar distribution is seen in *Sparganium eurycarpum,* not of such general distribution as *Lemna,* but in eastern New England and the Maritime Provinces confined to the coastal clays from the Magdalen Islands southward, extending into northwestern Nova Scotia and the clay valleys of southern New Brunswick and southern Maine, and like *Lemna* and *Typha angustifolia* appearing again in the Champlain and Ottawa regions to the westward. In general, though these plants are often of broad interior distribution in the North American continent, in New England they are of limited range, confined to the coast and occurring inland in such areas as northeastern Massachusetts, the clay regions of the Maritime Provinces, Lake Champlain and the river valleys of Southern New England. Nearly all of them, together with many true halophytes, occur in the salt regions of western New York. It is apparent that this distribution coincides to some extent with the limits of the Champlain Sea which has already been discussed. Thus Fernald[1] writes, "The distribution of *S[parganium] androcladum* (*S. lucidum*) is unusual. Abundant in eastern Missouri and adjacent Illinois, it is apparently unknown or at least unrecorded in the region between the Mississippi Valley and eastern Pennsylvania. Thence it extends to Long Island and eastward to Nantucket, Cape Cod, and Middlesex County, and up the Connecticut Valley to Franklin County, Massachusetts. It seems to be isolated in the Champlain Valley, Vermont (bank of Winooski

[1] Rhodora, **24**: 28. 1922.

River, Burlington, Aug. 30, 1903, *N. F. Flynn*) and in the St. Lawrence Valley below Quebec (Beauport, July 30, 1905, *J. Macoun* no. 68,925). This distribution in New England and eastern Canada suggests that the plant has followed inland the regions where marine clays left by the Champlain subsidence are found and that search will show it to be more abundant that we now realize." In describing the distribution of *Cakile edentula*, Victorin[1] writes "Cette plante, bien que caractéristique de l'habitat salin, se retrouve sur les bords des Grands Lacs. Nous avons hasardé ailleurs une hypothèse au sujet de ce fait de géographie botanique. Il est probable qu'à l'époque Champlain, par suite de l'invasion marine, les eaux des Grands Lacs sont devenues saumâtres. Le Caquilier une fois établi a pu s'accomoder graduellement au changement de salure des eaux."

If the climate was at the time suitable for plant growth, the Champlain Sea must have been more or less effective for the introduction of maritime plants into the interior, and it might be expected—as occurred to the older botanists—that some of these plants would remain in places where salt deposited by the marine waters was not wholly leached out, as, for example, compact marine clays. The opinion has been expressed that inland distribution of plants which grow in brackish habitats might follow the limits of the Champlain submergence in New England, in other words, their distribution might to a large extent be controlled by this factor. The unusual distribution of *Lemna, Typha angustifolia, Sparganium eurycarpum, Iris prismatica,* and others in New England, and their occurrence with many well-known halophytes in Western New York made this plausible. With the knowledge of controversial reports by Fairchild and others regarding the limits of marine submergence, the problem of relationship of plant distribution in New England with the Champlain Sea, was assumed. There has been extensive work on similar problems in Europe, involving both the living and fossil floras, where, moreover, the limits of post-Pleistocene submergences analogous to the Champlain submergence have been more thoroughly studied than in America. Although, early in the prosecution of this work, it appeared that Post-Pleistocene marine submergence was not the main limiting factor in the distribution of these plants in eastern North America, yet it seemed of interest to carry the work to a conclusion, with a critical survey of geographical ranges of the plants together with the literature.

[1] Marie-Victorin, Frère. La Flore du Temiscouata, p. 66. Quebec. 1916.

Complexity is heightened by soil and climatic factors. Further, it is not possible clearly to differentiate plants of fresh water habitats and those which live in brackish or salt water. Thus Nichols[1] (p. 380–381) says of the Cape Breton vegetation, "It is impossible to draw a sharp line between brackish and salt swamps, on the one hand, and between brackish and fresh swamps, on the other. In the character of the predominant plants, the vegetation of the higher, shoreward reaches of a well developed salt marsh almost invariably resembles that of a brackish meadow, and it commonly includes various species characteristic of fresh water swamps." "The vegetation . . . that of a slightly brackish marsh, consisting largely of *Spartina Michauxiana, Agrostis alba maritima, Scirpus americanus* and *Eleocharis palustris*, together with *Potentilla pacifica, Triglochin palustris*, and *Carex maritima.* In the open water of the channel grow *Ruppia maritima* and *Potamogeton pectinatus.* Bordering the pool is a zone of *Typha latifolia*, followed by a zone of *Juncus balticus littoralis.*" This description might well, with the exception of one or two species, describe the vegetation of the brackish shores along the entire coast of New England and the Maritime Provinces. A list of thirty such indifferent halophytes follows (see page 65), showing the inland distribution of plants of maritime shores and brackish marshes, in certain areas which are significant from the point of view of the Champlain submergence. The accompanying notes afford a more detailed account of the distribution of these plants and the reasons for including or omitting certain species. A large part of the area under consideration has been personally investigated by the writer; further information concerning distribution of these plants has been obtained from reliable local floras, the Gray Herbarium, and the herbaria of the New England Botanical Club, the Boston Society of Natural History, Massachusetts Agricultural College, New York State Museum and Union College.

The plants classified here as "indifferent halophytes" are essentially those which St. John[2] lists as "halophytic along the south shore of Saguenay County, but broadly distributed across the interior of North America" with the addition of some plants of more southerly range. Many plants considered as maritime by Hitchcock and

[1] Nichols, G. E. The Vegetation of Northern Cape Breton, Nova Scotia. Conn. Acad. Arts and Sciences **22**: 249–467. 1918.

[2] St. John, H. A Botanical Exploration of the North Shore of the Gulf of St. Lawrence. Can. Dept. Mines. Memoir **126**: 11. 1922.

Drummond—plants growing on the sea strand and dunes—have been shown by Kearney to be nonhalophytic, although here again it is difficult to draw a distinct line. Kearney,[1] in describing the excessive light and heat on the sea shore writes, "All the conditions of the environment are common as well to the sandy beaches of great fresh water lakes, so that it is in no way remarkable, from an ecological point of view, that such typical sea coast plants, for example, as *Ammophila arenaria, Cakile americana, Lathyrus maritimus* and *Euphorbia polygonifolia* are likewise found on the shores of Lake Michigan."

Some halophytes of interior distribution are excluded from this list since they occur frequently as weeds and often depend largely upon man for their dispersal. Such plants are *Hordeum jubatum, Chenopodium leptophyllum, Atriplex patula* and var. *hastata, Rumex maritimus* var. *fueginus.* With the exception of *Stellaria humifusa* which was collected by Goodale in the upper St. John valley in 1862, but which has not been found there since that time, no true halophytes have been found growing naturally in the interior of New England or the Maritime Provinces, except in the salt springs of New Brunswick, of which an account will be given later.

The indifferent halophytes, which occur inland in New England and the Maritime Provinces, are listed in the following table, and their occurrence in the critical areas here discussed is indicated by asterisks. The table is followed by detailed notes upon the distribution of particular species.[2]

[1] Kearney, T. H. Are plants of sea beaches halophytes? Bot. Gaz. **37**: 436. 1904.

[2] Local floras cited are:

Stone, G. E. A List of Plants in Franklin, Hampshire, and Hampden Counties, Massachusetts. Amherst. 1913.

Hoffmann, R. Flora of Berkshire County, Massachusetts. Proc. Boston Soc. Nat. Hist. **36**: 171–382. 1922.

Conn. fl.: Catalogue of the Flowering Plants and Ferns of Connecticut. Conn. State Nat. Hist. Survey. Bull. **14**: 1910.

Citations of habitat are from specimens in the Gray Herbarium and the herbarium of the New England Botanical Club, unless otherwise noted.

	Lake Champlain region	Generally distributed in clays of eastern Maine	Upper St. John Valley	Merrimac and Concord Rivers	Connecticut Valley, Massachusetts	Housatonic Valley, Massachusetts	Ottawa Region	Western New York	Northeastern New York	Great Lakes	Canada Salt Plains
Typha angustifolia..	*				*	*	*	*	*	*	
Sparganium eurycarpum............	*	*		*	*	*	*	*	*	*	*
Potamogeton pectinatus...........	*		*		*	*	*	*	*	*	*
Potamogeton bupleuroides........	*	*	*	*	*	*		*	*	*	
Potamogeton Friesii.	*					*		*	*	*	*
Potamogeton filiformis & vars.......	*		*			*		*		*	*
Zannichellia palustris.............	*							*		*	?
Triglochin maritima.			*				*	*		*	*
" palustris.			*					*		*	*
Sagittaria heterophylla..........	*			*	*	*	*	*	*	*	
Spartina Michauxiana............	*		*	*	*		*	*	*	*	*
Hierochloe odorata..	?	*	*	*	*	*	?	*	*	*	*
Phragmites communis..........		*	*	*	*	*	*	*	*	*	*
Cyperus ferax					*			*		*	
Eleocharis olivacea..	*			*	*	*		*	*	*	
Scirpus americanus.	*	*		*	*	*	*	*	*	*	*
" validus.....	*	*	*	*	*	*	*	*	*	*	*
" acutus.....	*	*		*		*	*	*		*	
" fluviatilis...	*			*			*	*		*	
" heterochaetus......	*						*	*	*	*	
Lemna minor......	*			*	*	*	*	*	*	*	*
" trisulca	*		*			*	*	*	*	*	*
Juncus balticus var. littoralis........			*					*	*	*	*
Iris prismatica.....				*							
Potentilla Anserina	*		*				*	*	*	*	*
Lathyrus palustris .	*		*					*	*	*	*
" maritimus	*							*	*	*	*
Hibiscus Moscheutos.............				*				*		*	
Myriophyllum exalbescens.........	*		*			*	*	*	*	*	*
Samolus floribundus.	*						*	*	*	*	

Typha angustifolia L. In brackish and salt marshes along the coast north to Damariscotta Mills, Maine (Rhodora **23**: 199, 1921). Rare inland except in the region of Lake Champlain. In Massachusetts reported from Belchertown (*G. E. Stone*), and as rare in Berkshire County (*Hoffmann*). In Connecticut, inland at Oxford and Salisbury (Conn. fl.). Common in the lowlands about Albany and Schenectady and central New York. The narrow-leaved forms of *T. latifolia* are often confused with this species.

Sparganium eurycarpum Engelm. Characteristic of clays along the coast, rarely in the interior, but not so characteristically halophilous as *Typha angustifolia.* Inland in eastern Massachusetts, Connecticut valley, Housatonic valley, Lake Champlain, and eastern New York. Of its presence at Bic, Rimouski County, Quebec, Professor Fernald writes (Rhodora **10**: 96. 1908), "The most northerly stations previously known to the writer for *Sparganium eurycarpum* are at Pictou, Nova Scotia, about 350 miles to the southeast [of Bic], at Oldtown, Maine, 200 miles or more nearly due south, and on Lake Champlain." During the summer of 1923, N. C. Fassett and the writer found it at Montmagny, about 130 miles southwest of Bic. Some collections in brackish habitats are: Quebec: salt marsh, Bic (*M. L. Fernald*); brackish ponds and deadwaters of inlet streams, Magdalen Islands (*Fernald & Long*); Maine: by alkaline pool, Woolwich (*Fernald & Long*); Mass.: brackish swamp, Scituate (*E. F. Williams*); etc.

Potamogeton pectinatus L. This species of pondweed is characteristically maritime in eastern New England and the Maritime Provinces. In Maine known only from the valley of the St. Francis River, Aroostook County (*M. L. Fernald*), and from brackish pools at the mouth of the Kennebec River. In eastern Massachusetts it occurs only in the lagoon-like brackish ponds of southern Cape Cod and the neighboring islands, but is widely distributed in western New England, in the Connecticut River to Hanover, New Hampshire, in eastern New York, Lake Champlain, and the interior of North America.

Potamogeton bupleuroides Fernald. Most common in brackish pools but is widely distributed in inland waters in Maine, New Hampshire, and western Massachusetts. "In ponds, streams, and brackish waters. Occasional near the coast, extending inland as far as East Windsor." (Conn. fl.)

Potamogeton Friesii Rupr. This species has the following distribution: river-mouths entering the Gulf of St. Lawrence in southern Labrador, Western Newfoundland, the Magdalen Islands, Prince Edward Island, and at Truro and Amherst in Nova Scotia. It reappears in the Champlain region, western Massachusetts, and western Connecticut. The only station in eastern New England was at Fresh Pond [formerly brackish], Cambridge, Massachusetts. It is also found at the mouth of the St. John River in Gaspé, at Seneca Lake, New York, and infrequently at stations about the Great Lakes.

Potamogeton filiformis Pers. including var. *borealis* St. John. Of northerly range and characteristic of calcareous regions, but often in brackish water in the St. Lawrence region. In New England only from Lake Champlain, and a single station at Fort Fairfield, Maine. Westward it is widely distributed.

Triglochin maritima L. In New England known exclusively as a salt marsh plant, with the exception of two stations in Maine, one at Caribou Bog, Crystal, the other on gravelly beaches at Fort Fairfield. However, it is common in the interior of Newfoundland, occasional in swamps and bogs of central and western New York, and of wide continental distribution.

Triglochin palustris L. "It is a common plant of limy or slightly brackish wet places in the northern section of the state [Maine] as well as in northern New Brunswick and Quebec, and it follows the coast, in brackish marshes, to Wells, near the New Hampshire border." (M. L. Fernald, RHODORA **10**: 172. 1908.) It is of more northern distribution than *T. maritima*, which extends southward to Ocean County, New Jersey. It is also occasional in central and western New York.

Sagittaria heterophylla Pursh. Of very limited distribution in Berkshire County, becoming abundant in the Lake Champlain region and eastern New York. Otherwise confined in New England almost entirely to the tidal mouths of the larger rivers, such as the Kennebec in Maine. In New Hampshire it follows the Merrimac River to Manchester, and is reported from Hanover (*E. F. Williams*). In Massachusetts and Connecticut it is known from the Connecticut and Housatonic Rivers.

Zizania aquatica. For a recent critical treatment of this species N. C. Fassett, see RHODORA **26**: 153–160. 1924. It occurs often

in brackish water, and also in the critical areas which are listed, with the exception of the upper St. John, and the Housatonic Valley. The range of typical *Z. aquatica* is described (l. c. p. 156) as "mouths of rivers and in brackish places, along the Atlantic coast of North America from southern Maine to western Florida and probably Louisiana, inland in northern New York, and rarely in Michigan." However, some of the varieties of *Z. aquatica* have wide inland distribution. This plant was omitted from the list of indifferent halophytes, and is not especially important in respect to the problem under discussion.

Spartina Michauxiana Hitchc. This grass, so common at the edge of salt marshes, is not infrequent about the larger lakes of Maine and Lake Champlain. In Massachusetts, it is found inland along the Concord, Charles, and Connecticut Rivers, and in two localities in Worcester County. "Frequent to common along the coast and near tidal rivers; rare inland as at Glastonbury and Oxford." (Conn. fl.)

Hierochloe odorata (L.) Wahl. Frequent about borders of salt marshes, occurring occasionally inland, even at high altitudes.

Phragmites communis Trin. "Borders of marshes, either salt or fresh. Apparently rare inland." (Conn. fl.) In the clay country of western Nova Scotia, Prince Edward Island, Magdalen Islands, and New Brunswick, southward along the coast. Inland to Lake Champlain, the upper St. John River, and several localities in central and southwestern Maine; in Massachusetts along the Concord and Connecticut Rivers, and very rarely in Berkshire County.

Cyperus ferax Rich. A southern species of salt-marsh borders as far north as eastern Massachusetts. Inland on the Neponset marshes near Boston, and reported from the Connecticut River meadows (*G E. Stone*). Also in western New York.

Ranunculus Cymbalaria Pursh. This is best treated as a "halophyte." "Ranunculus Cymbalaria Pursh, originally described from the saline marshes of Onondaga Lake, New York, is found in saline habitats in northern or cooler areas of North America and Asia. In America it extends southward along the coasts to New Jersey and California, and through the interior to western New York, Illinois, Texas and Central Mexico." (See M. L. Fernald: The Variations of Ranunculus Cymbalaria, Rhodora **16**: 160–163. 1914.) It also grows about the salt springs of New Brunswick.

Eleocharis olivacea Torr. Perhaps most characteristic of fresh-water swamps, but reaching its best development in brackish water. North as far as Mt. Desert and Nova Scotia. Rather common in northeastern Massachusetts; occasional in the Connecticut, Housatonic, and Champlain Valleys.

Scirpus americanus Pers. Abundant in salt marshes along the coast, and frequently inland on the borders of sandy ponds. MAINE: in Androscoggin Valley to Leeds and Poland; N. H.: Manchester; MASS.: borders of ponds near the coast, especially in Plymouth County and Cape Cod, Brookfield (Worcester County), and at two stations on the Connecticut River, occasional in Berkshire County; VT.: common in the Champlain region.

Scirpus validus Vahl. Well distributed throughout, but most abundant in brackish marshes.

Scirpus acutus Muhl. Widely distributed in eastern Maine and New Brunswick; along the Merrimac, Charles, and Concord Rivers and in Berkshire County in Massachusetts, also Cape Cod and Nantucket; Coos County in New Hampshire; Litchfield County and Hartford in Connecticut; and around Lake Champlain.

Scirpus fluviatilis (Torr.) A. Gr. Local, known at the following places. N. B.: Westfield, Nerepis River, "at high tide nearly covered" (*M. L. Fernald*); MAINE: tidal swales, Bowdoinham, Phippsburg; MASS.: Lawrence, Watertown; CONN.: fresh and salt creeks and marshes, and along the Connecticut River to East Windsor; VT.: common around Lake Champlain. Occasional in eastern New York, and to the westward.

Scirpus heterochaetus Chase. In New England known only from Lake Champlain and from the Charles River at Dedham, Massachusetts. It occurs in northeastern New York (see RHODORA **25**: 208. 1923) and westward.

Lemna minor L. The distribution of this plant has already been noted. It is also occasional in the valley of the Housatonic in western Massachusetts, and in western Connecticut.

Lemna trisulca L. More local than the preceding species. It has a similar distribution in the Maritime Provinces, is known from Houlton and Rockport in Maine (see RHODORA **23**: 199. 1921), and in New Hampshire at Seabrook, on the coast. In eastern Massachusetts it has been reported from Medford, Cambridge, and South Lincoln, and from several stations on Nantucket. On western Mas-

sachusetts, western Connecticut, and the Champlain region it is not uncommon, and is of wide continental distribution to the westward.

Juncus balticus Willd. var. *littoralis* Engelm. Ordinarily a plant of sea strands and brackish meadows, it is found far up the St. John valley, inland along the shores of the Great Lakes, and in bogs in western New York.

Iris prismatica Pursh. This is a southern species extending north to Wells Beach, Maine, and isolated on Cape Breton Island. Characteristic of the edges of salt marshes, but found inland in fresh meadows near the coast as far west as the Concord River, Massachusetts.

Potentilla Anserina L. This should not be confused with *P. pacifica* Howell. Beaches about the Gulf of St. Lawrence, and apparently indigenous in the St. John Valley, Champlain Valley, and northwestward. The European plant is occasionally introduced on the seashore about cities.

Lathyrus palustris L. and vars. Commonly in brackish situations near the seashore, occurring inland in the St. John Valley and the Lake Champlain region. Rather common inland about the Great Lakes.

Hibiscus Moscheutos L. A southern plant occurring in salt marshes along the coast, and inland in the Charles and Concord Rivers, Massachusetts. Also at Woodbury, Conn. (Conn. fl.) and in central New York.

Myriophyllum exalbescens Fernald. A calciphile species occurring also in brackish water. Known at Blanc Sablon, Labrador and the west coast of Newfoundland; in the St. John Valley, Maine; and at a few stations, chiefly brackish, along the coast to New Haven, Connecticut. Occasional west of the Connecticut River and about Lake Champlain. (See Rhodora **21**: 120–124. 1919.)

Samolus floribundus H. B. K. Of extensive interior distribution in the southern and central states, but, except at stations in Brattleboro and Middlebury, Vermont, confined to brackish river estuaries in New England and the Maritime Provinces, and the brackish pond shores of Marthas Vineyard and Nantucket.

From the list of indifferent halophytes *Eleocharis palustris* has been omitted. This represents a technically complex group, the var. *glaucescens* (Willd.) Gray, often characteristic of brackish water, but having a distribution not well defined. *Echinochloa Walteri* (Pursh)

Heller, likewise difficult of identification from reports, is recorded by Wiegand (Rhodora **25**: 62. 1923) from "brackish marshes along the coast from New Hampshire to Florida, Texas, and the West Indies, and also inland about the Great Lakes." House (N. Y. State Mus. Bull. 254: 72. 1924) reports it as "local or rare inland to the marshes of western and central New York and northward to St. Lawrence County." *Eleocharis diandra* Wright has also been omitted; although it sometimes occurs in brackish places, it can scarcely be considered as halophytic. *Ptilimnium capillaceum*[1], although occurring inland in the southern states, apparently does not come into the zone of the Champlain submergence.

From the foregoing discussion of the distribution of indifferent halophytes it is clear that none of them are confined to the area of the Champlain submergence, with the possible exception of *Zannichellia palustris*, which is known inland in New England only from Lake Champlain. Of the thirty plants tabulated in the list, sixteen occur in the Housatonic valley in Massachusetts, and thirteen in the Connecticut valley in Massachusetts, areas clearly beyond the influence of the Champlain submergence. Likewise in eastern New York, Stoller[2] has clearly shown that the marine submergence did not include the ancient Mohawk River channel, represented by Round Lake, Ballston Lake, and Alplaus Creek, connecting with the present channel at Schenectady. At Ballston Lake and Round Lake the writer has noted *Typha angustifolia, Sagittaria heterophylla, Lemna minor*, and *Lemna trisulca*, and in addition to these *Potamogeton pectinatus, Phragmites communis, Scirpus fluviatilis*, and *Hierochloe odorata* occur at Schenectady, all outside of the range of the Champlain submergence. In eastern Massachusetts we find *Iris prismatica* in meadows into which the marine waters could not possibly have come. Knowlton,[3] in describing the flora of the Sandy River Valley in Maine, mentions the marine clays and sands left near Farmington but lists no plant that might be considered significant from the point of view of submergence. However, in considering the Merrimac Valley which Antevs (l. c.) has shown to have been submerged as far as Manchester, New Hampshire, we find occurring inland to Man-

[1] *Ptilimnium capillaceum* is regarded by Taylor as possibly representing a relic from marine submergence in New Jersey. See N. Y. Bot. Gard. Memoir **5**: 11. 1915.

[2] Geol. Soc. Am. Bull. **33**: 515–526. 1922.

[3] Rhodora, **16**: 11–17. 1914.

chester, *Scirpus americanus, Potamogeton pectinatus, Sagittaria heterophylla,* and *Eleocharis diandra.* The vegetation of the Merrimac Valley has not been carefully investigated from this point of view and it is possible that we might have here plants limited in their distribution to the former extent of the Post-Pleistocene sea. However, a reconnaissance of the Lake Champlain region, the St. Lawrence Valley, and eastern New Brunswick in the summer of 1923, did not bring to light any indication of the survival of maritime plants in regions clearly covered by the Champlain submergence.

(*To be continued.*)

SOLIDAGO ALTISSIMA L.

Kenneth K. Mackenzie.

As is known, we have in the eastern United States one group of strongly stoloniferous goldenrods characterized by triple-nerved leaves to which belong the species now appearing in our botanies as *Solidago canadensis* L. and *Solidago altissima* L., and another group of strongly stoloniferous goldenrods characterized by not having triple-nerved leaves, to which group belongs the species now appearing in our manuals as *Solidago rugosa* Mill.

Now, some time before he published his work Hortus Upsaliensis in 1748, Linnaeus grew in the gardens at Upsala, Sweden, two species of American goldenrods. The first species, which later became the primary basis for his *Solidago canadensis*, was especially characterized by "foliis trinerviis."

The second species, which five years later became the primary basis for his *Solidago altissima*, was described as follows:

"2. SOLIDAGO paniculato-corymbosa, racemis reflexis, floribus adscendentibus, foliis enerviis integerrimis.

"Virga aurea altissima serotina, panicula speciosa patula. *Martyn. hist.* 14. *t.* 14.

"Habitat in *Malandia* [should be Marilandia].

"Hospitatur, *sub dio*, perennis.

"Obs. *Praecedenti valde affinis a qua differt:* 1. Foliis *crassioribus, margine vix vel parum scabris, superficie vix manifeste* trinervi. 2. Caule *duplo altiore, seu quadrupedali.* 3. Tempore *florendi seriore, scilicet octobri.*" Linnaeus Hort. Ups. 259. 1748.

It will be noted that he particularly emphasized the fact that the leaves were "superficie vix manifeste trinervi" and that the plant was twice as tall as the first species and was a late-flowering plant.

Five years later, in publishing *Solidago altissima,* he amplified his description and remarks as follows:

"3. SOLIDAGO paniculata-corymbosa, racemis recurvis, floribus adscendentibus, foliis enerviis subintegerrimis. *Hort. ups.* 259.

"Virga aurea altissima serotina, panicula speciosa patula. *Mart. cent.* 14. *t.* 14.

"*Habitat in* America *septentrionali* ♃.

"Habitus *praecedenti simillimus, diversus magnitudine, tempore florendi, serraturis nervisque foliorum; caeterum eadem commiscet plantas vix genuinas, forte hybridas, ut vix limites reperias. Itaque conferantur.*

"Virga aurea novae angliae altissima, paniculis nonnunquam reflexis. *Boerh. lugdb.* 1. *p.* 97.

"Virga aurea americana hirsuta, radice odorata. *Dill. elth.* 410. *t.* 304. *f.* 391.

"Virga aurea novae angliae, rugosis foliis crenatis. *Dill. elth.* 406. *t.* 308. *f.* 392.

"Virga aurea americana aspera, foliis brevioribus serratis. *Dill. elth.* 411. *t.* 305, *f.* 392.

"Virga aurea marilandica, spicis florum racemosis, totiis[1] integris scabris: *Mart. cent.* 13. *t.* 13."

Linnaeus Sp. Pl. **2:** 878. 1753.

And later (Sp. Pl. (Ed. 2) **2:** 1233. 1760) he changed the word "subintegerrimis" to "serratis."

In arriving at a proper conclusion as to the proper use of the name *Solidago altissima* we must, of course, always bear in mind that Linnaeus had before him not only an actual specimen, but had grown the plant he named in the gardens at Upsala. Under such circumstances, if he cited plates from other authors representing some other species, his name must be applied to the plant he had before him and not to any other plant.

The plant so described by Linnaeus was, for about a hundred years, identified with the plant which has more recently been called *Solidago rugosa* Mill. Then very unfortunately, Dr. Asa Gray noticed that Martyn's plate fourteen cited by Linnaeus was not the plant to

[1] The word "totiis" is a misquotation for "foliis."

which the name *Solidago altissima* was being applied. Thereupon, he announced (Proc. Am. Acad. **17**: 177. 1882) that the name *Solidago altissima* must be treated as a synonym of the other species of Linnaeus, *Solidago canadensis*, stating that "the true original of the Linnaean species is the "plant of Martyn's His. Pl." represented by an excellent plate."[1] He entirely passed over the fact that Linnaeus expressly declared that his *Solidago altissima* had "foliis enerviis" as compared with the "foliis trinerviis" of his other species. He properly emphasized the fact that the plates doubtfully referred to *Solidago altissima* by Linnaeus should not be controlling, but he failed to consider that all of these plates except Martyn's plate 13 emphasized the statement of Linnaeus that he was dealing with a plant not possessing "foliis trinerviis," as none of them except Martyn's plate 13 illustrate plants with three-nerved leaves.

Following this article by Dr. Gray, the unfortunate *Solidago altissima* L. was reduced to synonymy and there remained for a number of years. Then Prof. M. L. Fernald (Rhodora **10**: 91–2. 1908) proceeded correctly to identify Martyn's plate with a very widely distributed plant with triple-nerved leaves but with fairly large sized heads, and contrasted it with another widely distributed plant with triple-nerved leaves and small heads to which he restricted the name *Solidago canadensis*. On the basis of this identification he used the name *Solidago altissima* for the former plant. He quoted some of the remarks of Linnaeus, but, for some reason unknown to me, failed in any way to allude to the fact that Linnaeus described *Solidago altissima* as not having triple-nerved leaves; and failed to allude to the long continued use of the name by numerous botanists for the plant which he has called *Solidago rugosa*.

In the Linnaean herbarium there is much confusion about the specimens of *Solidago altissima*. One sheet is a mixture of *Solidago ne-*

[1] The history of the Linnaean *Solidago canadensis* is curiously similar to that of *Solidago altissima*. It was primarily based on a plant cultivated at Upsala, and in describing it, Linnaeus cited "Virga aurea angustifolia, panicula speciosa canadensis. *Pluk. alm.* 389 *t.* 236 *f.* 1." He took his name from this Plukenet citation and it is the "true original of the Linnaean species" (*Canadensis*) just as much or just as little as the Martyn plate is the "true original" of *Solidago altissima*. Nevertheless, Gray said: "The Syn. Pluk. Alm. t. 236, fig. 1, which may have suggested the specific name, is to be excluded." (Proc. Amer. Acad. **17**: 177. 1882). Then he identified the Plukenet figure with *Solidago odora* Ait. (Syn. Fl., 1²: 151. 1884.) Following the course adopted with *Solidago altissima*, he should have used the name *Solidago canadensis* for *Solidago odora*. As I have indicated I do not think the course followed with *Solidago altissima* was correct, nor do I think that the Plukenet figure represents *Solidago odora*.

moralis, *S. bicolor* and *S. odora*. Another "ticketed by Linnaeus '*altissima*' is noted, apparently by Smith's hand, as '*S. Canadensis*,' but it probably is not" (Gray, Proc. Am. Acad. **17**: 177. 1882).

A very interesting sheet, however, exists, the significance of which Gray failed to recognize. He says, "a specimen ticketed '*serotina*' by Linnaeus, and by Smith '*altissima*' is the species which has so long passed as *S. altissima;* viz, *S. rugosa* Mill." (Gray, l. c.). Turning again to the Linnaean description of *S. altissima*, it is to be noted that he particularly dwelt on the species being a very tall one and also a late-flowering one. Martyn also used both the words "*serotina*" and "*altissima*" in connection with his plant. Linnaeus named his species "*altissima*," probably both from his own description and from Martyn's name. It may, therefore, be hazarded that he had first named it "*serotina*" both from his own description and Martyn's name, and that he failed to change his herbarium sheet. It will be recalled that he never published any "*Solidago serotina*" and the only sheet in his herbarium which fully answers his description of *Solidago altissima* is the one marked by him *Solidago serotina* and noted by Smith as *Solidago altissima*. It will be recalled too, in this connection, that *Solidago bicolor* appears in his herbarium as *Solidago discolor*.

I am sure that Gray's statement that "Linnaeus did not well know his species of *Aster* and of *Solidago*" (Proc. Am. Acad. **17**: 168. 1882) is most emphatically a correct statement. Both his *S. canadensis* and his *S. altissima* are mixtures, and his herbarium is a very sad mixture. In his conception of *Solidago altissima* he first had mixed in some plant with entire leaves, either *Solidago odora* or the Martyn plate 14. As shown, he himself gradually eliminated this and his final description is a consistent one.

It seems evident then that *Solidago altissima* should again be used as it was for about a century before 1882; namely, for the species which has of late been appearing in our botanies as *Solidago rugosa* Mill.

Solidago hirsutissima Miller Gard. Dict. Ed. 8 (Solidago No. 15) 1768 is I believe the name to be used for the plant which has lately been appearing as *Solidago altissima* L.

Maplewood, New Jersey.

Streptopus oreopolus in the White Mountains.—*Streptopus oreopolus* Fernald, Rhodora, viii. 70 (1906), is an abundant species of subalpine woods and meadows of the Shickshock Mts. of Gaspé and it has recently been found to be equally characteristic of subalpine slopes in northwestern Newfoundland. It was, therefore, peculiarly interesting to find in a collection of miscellaneous specimens recently transferred from the Botanical Museum of Harvard University to the Gray Herbarium a very typical sheet of flowering material of *S. oreopolus*, collected by W. N. Suksdorf on Mt. Washington, New Hampshire, July 17, 1887. The plant had been labeled in the hand of Dr. J. W. Blankinship "*Streptopus roseus* Mx.?", thus indicating a long-standing doubt as to its identity. The fact that it was collected by Suksdorf is determined from other labels of similar date, which bear his name; Mr. Suksdorf having been an assistant to Sereno Watson in 1886 and 1887. *S. oreopolus* has the long recurving perianth-segments of *S. amplexifolius* DC., but the flowers are deep crimson; and the leaves, instead of being whitish beneath, are green, only slightly paler than above. All specimens in the herbarium of the New England Botanical Club (22 of them from the White Mountains) are typical *S. amplexifolius* and *S. roseus*.—M. L. Fernald, Gray Herbarium.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

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POLYGONUM HYDROPIPER IN EUROPE AND NORTH AMERICA.

E. E. Stanford.

Polygonum Hydropiper L. is a characteristic and well-marked European species which is also somewhat widespread in North America. Recent American floristic works give the impression that it is indigenous in some portions at least of its American range. The discovery of a rather well-marked variety, described later in this paper, which is characteristic of a considerable portion of the American range of *P. Hydropiper*, lends a certain interest to the nativity of the American plant and justifies some discussion of the records of *P. Hydropiper* in America.

The "*P. Hydropiper*" of early writers is strongly suggestive of *P. punctatum* Elliott (*P. acre* HBK.).[1] *P. punctatum* resembles *P.*

[1] American botanists have not been in full agreement as to the name to be used for this species, but *P. punctatum* Elliott and *P. acre* HBK. are usually considered synonymous. The dates of publication are very close, and the records of that time are not all that might be desired. Most of the early North American works used the name of Elliott, probably largely because they were more certain of the identity of his plant than of the one described by Kunth from "prope Havanam et Caracas." Also, in the earlier days the question of priority had not assumed its present importance. The first volume of the more common two-volume edition of Elliott's "Sketch" bears the date of 1821; it was, however, issued in a previous edition serially during 1816 and 1817. This edition is very rare. Part V, bearing the treatment of the Polygonums, as preserved in the Library of the Gray Herbarium, bears the date 1817. Barnhart (Bull. Torr. Bot. Cl. xxviii. 680–688) has investigated the date of its publication and places it as probably December, 1817. The present writer has made inquiry of the Library of Congress and is informed that the South Carolina records concerned were probably destroyed during the Civil War. Under the circumstances there seems no prospect of fixing the date more exactly.

Vol. II of the folio edition of the "Nova Genera et Species" of Humboldt, Bonpland and Kunth is also dated 1817. This also appeared serially, and according to the researches of Barnhart (Bull. Torr. Bot. Cl. xxix. 585–598) the portion treating of Polygonum (ii. pp. 177–180) came out in February, 1818. Under the circumstances Elliott's name seems preferable, and will here be used, except when *P. acre* is used in a quotational sense.

Hydropiper in the bright green cast of its foliage, in its somewhat interrupted and uncrowded panicle, and particularly in the evident development of internal glands (never glandular hairs) and strong peppery flavor. Among the principal differences between the two are the rugosity and dull lustre of the often lenticular achene of *P. Hydropiper* as contrasted with the smooth shining surface of the normally trigonal fruit of *P. punctatum.* Detailed descriptions of the achenes of these plants, however, are hardly to be found in the observations of early American floristic writers. *P. punctatum,* however, has normally eight stamens and a five-parted white or whitish calyx, while *P. Hydropiper* usually possesses only six stamens and a rather herbaceous calyx which is most often four-parted. The earlier writers, following the Linnean system, were usually careful to enumerate the stamens, and in evaluating their descriptions more weight may be laid on this particular than on some others which might more quickly engage the attention of present-day systematists.

It might be noted in passing, that the examination of a considerable amount of material designated by various collectors as "*Polygonum Hydropiper*" and deposited in the Gray Herbarium indicates that the habit-similarities of these two technically well-defined species still cause a great deal of confusion among American collectors. Appearance of reduced panicles within the ocreae of *P. Hydropiper,* with a resultant rather bulged appearance of the short stipular sheath of this plant, contrasts strongly with the close-cylindric effect of the longer sheaths of *P. punctatum.* This character, not generally noted in the floras, was apparently first made known by Meehan.[1] This writer, oddly enough, published the phenomenon as a differential character occurring in *P. acre* HBK., rather than in *P. Hydropiper;* his error in identification was noted by Small in 1895.

The strong acrid pungency of *P. Hydropiper* attracted the attention of physicians of previous centuries, who employed it as a diuretic, as a blistering agent, and for various other purposes. Thus it is not surprising that the first references to what was taken for this plant in America are to be found in medical writings. Cutler, in 1785, employed the Linnean description of *P. Hydropiper,* but not the binomial, with the descriptive comment:

"Blossoms white. Common both in dry and moist land. August. It occasions severe smarting when rubbed on the flesh. . . . It

[1] Meehan. *On a special form of Cleistogamy in Polygonum acre.* Proc. Acad. Nat. Sci. Phila. 1892. 163–164.

dyes wool yellow. Dr. *Withering* says, it cures little aphthous ulcers in the mouth.—That the ashes mixed with soft soap is a nostrum, in a few hands, for dissolving the stone in the bladder; but perhaps not preferable to other caustic preparations of the vegetable alkali."[1]

And the German, Schöpf[2] uses the Linnean binomial, giving:

"LOC. Noveboraci subhumida."

and:

"VSVS: Calculus! Odontalgia, Excoriatura oris."

The text of neither of these writers is sufficiently explicit to exclude *P. punctatum.* The "white flowers" of Cutler are rather suggestive of that species. Cutler, apparently, never traveled abroad, but Schöpf, very probably, may have been familiar with the European plant.

Perhaps it is worth noting that *P. Hydropiper,* which of recent years has been forgotten by the medical profession, seems, judging from two recent papers, to have newly attracted attention in Russia as a hemostatic. Certainly there is need for something of this sort in Russia, and *P. Hydropiper* seems naturally well suited to the Bolshevik taste.

Among the systematists, Michaux seems first to have listed *P. Hydropiper* in America:

"P. stipulis laxis, glabris, apice ciliatis, maculatis: foliis lanceolatis, omisso margine glabris: spicis filiformibus, debilibus, subcernuis; bracteis remotiuscule alternis; floribus albidis, octandris, semitrigynis. *Obs.* Sapor, herba, florescentia *Hydropiperis* europaei. Flores semel vidi 7-andros, nunquam vero stamina pauciora.
Hab. in Pennsylvania, Kentucky, regione Illinoensi et Carolinis."[3]

Small, in 1895, accepted this description as referring without doubt to the Linnean *P. Hydropiper;* but whatever Michaux's personal knowledge of the European species described by Linnaeus (1753), the characters of the androecium and the white flowers engender a strong suspicion that Michaux's plant is the same that was later to be described by Elliott as *P. punctatum.*

Next, chronologically, comes the rather cryptic "Catalogus" of Mühlenberg (1813). The flowers of "*P. Hydropiper*" here are "alb.-pur." A purpurascent tint sometimes appears on the calyx-tip of *P. Hydropiper,* but the prevailing hue of the flower is greenish.

[1] Cutler, *An Account of Some of the Vegetable Productions naturally growing in this Part of America, botanically arranged.* Mem. Am. Acad. i. 439 (1785).

[2] Schöpf, Materia Medica Americana potissimum Regni Vegetabilis (1787). Reprinted as Bull. Lloyd Libr. no. 6. Reprod. Ser. no. 3 (1903).

[3] Michx. Fl. Bor.-Am. i. 238 (1803).

Pursh (1814), who referred *P. hydropiperoides* Michx. to *P. mite* Pers., described a "*P. Hydropiperoides*" of his own: "P. floribus 8-andris semi-3-gynis . . . *Michx. fl. amer. 1. p. 228. sub. P. Hydropiperide* . . . Flowers white; taste and appearance of *P. Hydropiper*, but different in the flowers." Here, again, the white flowers, 8 stamens and 3 styles at once suggest *P. punctatum*. Elliott (1817) proposed *P. punctatum*, which is described in fair detail and is generally considered synonymous with *P. acre* HBK. which was published at almost the same time. Elliott cites both *P. hydropiperoides* Pursh and *P. Hydropiper* Michx. as synonyms, and the same citation is given by such closely contemporary writers as Barton (1818), Darlington (1826) and Beck (1833), who do not list *P. Hydropiper*.

The first American description which appears really to fit the Linnean plant is that of Bigelow (1814):

"Stamens six; styles two, half united; leaves lanceolate, spotless, waved; spike filiform, nodding; stem erect. *Sm.*

Well known for its intense acrimony. . . . Stipules loose, glabrous, fringed with hairs at the top . . . Michaux observed eight, and never less than seven stamens in this plant in America . . . "[1]

"*Sm.*," carried back to Smith (1800) brings to light a Latin description from which that of Bigelow is a translation, and which was obviously drawn from English material. But Bigelow's second edition (1824) includes as synonyms *P. hydropiperoides* Pursh and *P. punctatum* Ell. The identity of Bigelow's plant, then, is rather problematical. If the description be taken at its face value it is apparently the oldest American description of true *P. Hydropiper*, but the citation of the synonyms indicates that Bigelow did not clearly understand the species.

The three editions of Darlington give some ground for the suspicion that the "*P. punctatum* Ell." of some of these early writers may really have been *P. Hydropiper*. In the first edition of the "Florula Cestrica" (1826: p. 48) the description of "*P. punctatum*" is brief, and might apply to either plant; but the notation of habitat suggests *P. Hydropiper:* "Barnyards, lanes, along ditches, &c. common."

In the second edition (1837: p. 248) the wording is much amplified: " . . . styles 2, or 3; seed lenticular, or triquetrous . . . *Flowers* articulated to pedicels about as long as the perianth . . .

[1] Bigel. Fl. Bost. 93 (1814).

Perianth green, covered with brownish glandular dots, the margins of the segments white, often tinged with purple . . . *Seed* compressed, ovate and lenticular, or ovoid-triquetrous . . . purplish black when mature, roughish punctate under a lens. *Hab.* Moist waste grounds; margins of pools & ditches: frequent . . . *Obs.* The *seeds* of this species are generally compressed, with 2 styles; but often on the same plant they are triquetrous . . ."

All of which is suggestive of *P. Hydropiper* and not of *P. punctatum;* furthermore, the flowers on pedicels about equaling the perianth and the compressed, ovate and lenticular (not flattened) fruit are characters of the American variety of the plant rather than of the European type. *P. Hydropiper* Michx. is included in the synonymy, with the statement "not? of L."

Darlington's third edition (1853: p. 247) elucidates the matter: "*P. Hydropiper* L. . . . P. punctatum. *Fl. Cestr. ed.* 2, *p.* 248, not of Ell. (*fide* ENGELMANN) . . . *Hab.* Moist waste grounds; introduced? . . . *Obs.* I have a suspicion that this is but a *naturalized* weed, among us. It would seem to be distinct from the *P. punctatum* of ELLIOTT,—with which I have hitherto confounded it. Dr. ENGELMANN, writing to me, in October, 1847, says—*Polygonum Hydropiper* and *P. punctatum* are two well-distinguished species; known from a distance already by the heavy pendulous green spikes of the former, and the light more distant-flowered erect whitish spikes of the latter; this has, also, amongst other distinguishing characters, shining smooth nuts,—the other opaque rough ones, &c. Both grow here [*St. Louis, Missouri*] common."

Though Darlington does not cite his first edition (1826) he no longer lists *P. punctatum* Ell. Therefore it is fairly apparent that *P. Hydropiper* was common in Chester County, Pennsylvania, as long ago as 1826, and (judging also by more recent references in which the two are confounded) it may well be conjectured that Darlington may not have been the only writer of that day to describe *P. punctatum* from *P. Hydropiper.* Engelmann's German botanical experience, coupled with his well-known powers of observation, accounts for his clear differentiation of these two species whose similarities had proved so deceitful.

Widespread occurrence in 1826, of course, does not necessarily mark the plant as native. *P. Persicaria* (a much more aggressive weed, however) was described from Virginia by Gronovius (1739) and is generally and probably correctly listed as an introduction. The first edition of Gray's Manual (1848: p. 387) describes "**P.**

Hydropiper, L. . . . *leaves* lanceolate . . . *wavy margined; sheaths inflated* . . . *fruit* either lenticular or 3-sided . . . *roughish* . . . (P. Hydropiperoides, *Pursh.* P. punctatum, *Ell.*) Low grounds, very common . . . A well-known, intensely acrid plant." The second edition (1856: p. 373) separates *P. Hydropiper* and *P. acre* HBK. (*P. punctatum* Ell.) with the comment on the former "(Nat. from Eu.)" In the fifth edition (1867: p. 416) is the remark as to *P. Hydropiper:* "apparently introduced eastward, but indigenous northward." Small, in 1895, amplified this somewhat: "Naturalized from Europe southward and eastward, said to be native in the north and west"; and this is virtually the statement carried in the seventh edition of Gray's Manual (1908).

Britton & Brown (1896) take another view: "Naturalized from Europe in our area, perhaps indigenous in the far Northwest," and this statement was also continued by Britton in 1901. Turning, therefore, to records primarily concerning other sections of the country, Walter (1788) and Elliott (1817) list from the South nothing suggestive of *P. Hydropiper.* It is also missing from the three editions of Darby's Southern Botany. Chapman (1860) does not contain it, but his second edition (1883) lists it as "Common Smartweed . . . Roadsides, Northern Georgia, and northward," without comment on its origin there. Among southwestern and western records, Porter cited "*P. Hydropiper*" as occurring at "Samoita Valley, Arizona, at 4,500 feet elevation . . . Rothrock (688). Introduced?"[1] But Rothrock's no. 688, as represented in the Gray Herbarium, is typical *P. punctatum* Ell. Watson in 1880, included *P. Hydropiper* as "A European species which also ranges across this continent northward; found in Washington Territory and perhaps in Northern California."[2] Coulter said "Ranging across the continent northward where it is probably indigenous."[3] Rydberg in 1917 said "nat. from Eu.";[4] Howell (1902) and Piper (1906) list *P. Hydropiper* from the Northwest, but offer no speculations as to how it got there,

Central and eastern Canadian records are scanty. Provancher (1862) lists a plant as: "*P. Hydropiper* Michx.—*P. punctatum* Ell. . . . Calice de même que le tige chargé de poils glanduleux,

[1] Porter, Rep. U. S. Geol. Surv. vi. 232 (1878).
[2] Watson, Bot. Cal. ii. 14 (1880).
[3] Coult. Man. Rocky Mt. Reg. 320 (1885).
[4] Rydb. Fl. Rocky Mts. 337 (1917).

brunâtres Styles 2–3. Akène trigone, non luisant, finement rugueux.—Canada—Floride: fossés; commune." The fruit is the fruit of *P. Hydropiper,* but the "poils" are the hairs of a stranger.

Macoun's Catalogue (1883) gives no formal description, but "In ditches by roadsides, and on roads in woods eastward and apparently introduced, but westward it is found on the margins of lakes, ponds and rivers where settlement has never taken place. It is easily distinguished from the next [*P. acre* HBK.] by its triangular, black and shining *achenium.*" There is the possibility that this may be in part responsible for the opinion of some later writers as to the western nativity of *P. Hydropiper.* But most evidently the plant is *P. punctatum.* Macoun's "*P. acre*" is not described; his means of differentiation suggests that it may be *P. Hydropiper.* All the stations listed for it are in Ontario.

It is evident from this possibly tedious review that the early history of *P. Hydropiper* on the continent is inextricably mixed with that of *P. punctatum* (chiefly, no doubt, with the slender annual var. *leptostachyum*). It is also evident that as long as a given plant passed as the latter it usually was supposed to be native, but that either, taken for *P. Hydropiper,* was very likely to be thought an immigrant. From the literature and from the collections of the Gray Herbarium it appears that *P. Hydropiper* in America is less widespread than is sometimes stated; considerably less widespread, for instance, than *P. Persicaria,* of whose foreign origin there is no doubt. The latter is a weed of cultivation; *P. Hydropiper* is of barnyards, wet lands, bogs, woods, and waste places. Yet the records and material do not indicate it as occurring far from civilization. From the available evidence, it occurs chiefly east of the Mississippi and in the Pacific Northwest.

In its most typical development the American variety of *P. Hydropiper,* presently to be described, occurs in eastern Canada and the United States from the Atlantic coast to Iowa and Oklahoma. Material from the Pacific states of Washington and Oregon, and the only specimen seen from Idaho, and certain scattered specimens from the eastern portion of this continent, appear to be inseparable from the European type. What information is available as to the locality of these specimens usually indicates them as of ballast neighborhood, waste-dumps, or of places long-settled. The frequent occurrence in the Pacific Northwest of evidently native types of various plants

quite inseparable from well-known European species is rather well-known; still, the evidence available in the case of *P. Hydropiper* would rather indicate it as an introduction in that part of the country.

As to the possible identity of the American variety with any European variation of *P. Hydropiper*, it may be said that the Linnean species is indeed a variable one, and one which has been extensively subdivided by European students, but the literature indicates that these European subdivisions are based chiefly on the habit and foliage rather than the characters of the inflorescence and fruit which are to be accentuated in the present instance. Some European material at hand resembles the American in certain respects, but the latter is believed to be sufficiently divergent and widespread on this side of the Atlantic to justify its separation.

A peculiarity sometimes noted in the European species is the production of comparatively large fascicles of elongated and imperfect achenes of a similar state of development, in contrast with the usual condition in the sugbenus *Persicaria*, which in the large-fascicled species usually prolong the period of development of the flowers of the fascicle. This tendency of the European material is also found in that from the Pacific Northwest, and in scattering eastern specimens otherwise referable to the European type, but is not noticeable in any material at hand which is otherwise of the American type, although the latter represents a considerably larger number of specimens. In view of the discussion of hybridism in an earlier paper,[1] the suggestion of that cause of this phenomenon may be raised, and cannot be dealt with summarily. There is also the possibility of concealed parasitism. Whatever the cause, its occurrence in material of the European type, and its absence in the American, is sufficiently striking to deserve mention.

The definite type of departure from the European characters of inflorescence and fruit as seen in the American variety seems too fundamental to have been established in the short period of European settlement of this country. It has been shown that the early records of this supposedly introduced plant are enveloped in a haze of uncertainty. Taking the situation as a whole, it seems to the present writer highly probable that the American variety of *P. Hydropiper* may represent a race of the plant whose establishment here far

[1] Stanford, *Possibilities of Hybridism as a Cause of Variation in Polygonum.* Rhodora, xxvii. 81–89 (1925).

antedates the settlement by white men and which has profited sufficiently by the advance of civilization to seize an increasingly prominent place in the American flora. For congeneric examples of a similar opportunism one need seek no further than the well-known *P. Careyi* Olney and *P. pensylvanicum* L., whose weed-tendencies entitle them to rank in that respect with most of the more assertive European additions to our flora.

The inclusive species, *Polygonum Hydropiper* may be defined as follows:

Plants annual, bright green or reddened, intensely acrid and glandular, but without glandular hairs; ocreae below usually dilated with more or less concealed diminutive panicles of cleistogamous flowers: typical panicles usually drooping: calyx green, mostly 4-parted, achene lenticular or trigonal.

The two American variations are distinguished below:

Pedicels not strongly exserted from the ocreolae: achenes mostly 3–3.5 mm. long. . . . . *P. Hydropiper*
Pedicels strongly exserted from the ocreolae: achenes 2–2.5 mm. long. . . . . *P. Hydropiper* var. *projectum*

Polygonum Hydropiper L. Sp. Pl. 361 (1753).—Annual, whole plant peppery and acrid: stem 2–6 dm. high, erect, or assurgent, the extremities somewhat drooping, often much branched, green or brown, glabrous; internodes 3–6 cm. long; nodes not much swollen: leaves ovate or ovate-lanceolate, 1–3 cm. wide, 4–9 cm. long, sessile or decurrent on a very short petiole, acute or acuminate, often blunt at tip, cuneate or cuneate-rounded at base, glabrous or glabrescent, glandular-punctate; margin and veins nearly nude or with minute bristles; margin somewhat crisped or undulate: ocreae 0.5–1 cm. long, scarious, brown, minutely glandular-roughened, rather loose, appearing inflated below because of partly concealed panicles consisting of a few flowers only; margin truncate, with a few short bristles (about 1 mm. long): inflorescence of numerous panicles, some rudimentary and partially or wholly concealed in the ocreae, others with long slender sinuous or nodding peduncles; ocreolae and few-flowered fascicles scattered along the rhachis or sometimes rather crowded: ocreolae 2–2.5 mm. long, narrow-turbinate, herbaceous or with reddened tips, nude or with sparse bristles, rather obliquely truncate: pedicels nearly or wholly included in the ocreola, appearing shorter than the fruiting calyx: calyx green or reddish-tipped, usually 4-parted to below the middle (sometimes 3- or 5-parted), copiously dotted with dark glands; fruiting calyx 3–4.5 mm. long, 2–2.5 mm. wide, closely inclosing the entire fruit, or the style-tips barely visible: stamens 6 or fewer, appearing reduced, included: style 0.5 mm. or less, 2- or 3-parted, included or sometimes exserted in fruit: achene

2–2.5 mm. wide, 3–3.5 mm. long, dark brown, lenticular and strongly convexed on one side, flattened or somewhat gibbous on the other, or trigonal with broad angles, dull and striate with minute punctations, rather sharp-pointed.—*P. Hydropiper* of European authors; not of American (for the most part at least). *Persicaria Hydropiper* (L.) Opiz, Seznam, 72 (1852).—Widespread in Europe; in North America introduced in Newfoundland, the Magdalen Islands, Quebec, Nova Scotia and Massachusetts; also Oregon, Washington, and Idaho; chiefly in or near settlements; probably elsewhere. The following are referred here. Newfoundland: Birchy Cove (Curling) *Fernald & Wiegand*, no. 3313. Quebec: Bords du ruisseau, Longueuil *Victorin*, no. 9745. Nova Scotia: Canso, August 23, 1901, *J. Fowler*. Massachusetts: moist ground, West Cambridge, *Gray Herb. Local Coll.* September 29, 1894; waste heap by Horn Pond, Woburn, October 11, 1896, *E. F. Williams*. Oregon: Portland, *Suksdorf*, no. 2951; Salem, *J. C. Nelson*, no. 2480, Linnton, *Suksdorf*, no. 1567. Washington: by a spring at Prindle, Skamania County, *Suksdorf*, no. 7418; Bingen, Klickitat County, *Suksdorf*, no. 6947. Idaho: stream-edge, Boise, *June A. Clark*, no. 294.

Var. **projectum** var. nov., foliis plerumque 1–1.5 cm. latis 4–5 cm. longis; ciliis ocrearum circa 2 mm. longis, ocreolis plerumque ciliatis; calycis fructiferis 2–2.5 mm. latis 2–2.3 mm. longis breviter ovoideis vel breviter trigonis exsertis; pedicellis gracilibus ocreolis subaequantibus; achaeniis 1.9–2.2 mm. latis 2–2.5 mm. longis trigonis vel biconvexis obtuse acuminatis nigrescentibus.—Presumably *P. Hydropiper* of the following American authors: Bigel. Fl. Bost. 93 (1814); Darlington, Fl. Cestr. ed. 3: 247 (1853); Gray, Man. 387 (1848), in part, and ed. 2: 373 (1856); Small. Monog. N. A. Polyg. 84 (1895); Britton & Brown, Ill. Fl. i. 560 (1896).[1] Wet places, borders of woods and waysides, Quebec to Wisconsin, southward to Oklahoma and Georgia; probably also in California. The following are referred here. Quebec: vicinity of Cap à l'Aigle, *Macoun*, no. 68,698; Little Metis, *Fowler*, August 27, 1906. Magdelen Islands: wet clearing, Grindstone, Grindstone Island, *Fernald, Long & St. John*, no. 7371. Nova Scotia: brackish shore, Sydney Mines, *Bissell & Linder*, no. 21,067; pebbly beach, Purcell's Cove, Halifax Harbor, *Howe & Lang*, no. 1504. Maine: Rumford, *Parlin*, 1889. Massachusetts: Jamaica Plain, *Faxon*, open roadside gutters near farm barns, Worthington, *Robinson*, no. 778. Rhode Island: ditches around Reservoir, Newport, *Rich*, September 21, 1901; Tiverton, *Greenman*, no. 1751. New York: low ground, Ithaca, *Metcalf*, no. 2238. Virginia: near Franklin, *Heller*, no. 1125. West Virginia: moist pebble shore, banks of Shaver's Fork, Parsons, Tucker Co. *A. H. Moore*, no. 2806 (type in Gray Herb.). Michigan: along a swamp road,

[1] Not *P. Hydropiper* Michx. Fl. Bor.-Am. i. 239 (1803); Darlington, Fl. Cestr. 48 (1826) and ed. 2: 247 (1837); Porter in Rothrock, Cat. Pl. Nev. etc. 231 (1878); Macoun, Cat. Can. Pl. i. 441 (1883); all of which are *P. punctatum* Ell.

Turin, Marquette Co., *B. Barlow*, August 10, 1901. WISCONSIN: Milwaukee, *Lapham*. ILLINOIS: rock barrens, Wakanda, *Gleason*, June 12, 1903; moist soil, Skokie Marsh, W. of Glencoe, *Sherff*, September 3, 1911. IOWA: Ames, *Pammel, Bell & Combs*, no. 197. OKLAHOMA: moist creek-bank near Shawneetown, McCurtain Co., *Houghton*, no. 3881 (distributed as *P. hydropiperoides*); by R. R. track near Howe, Leflore Co., *Stevens*, no. 27,981. The following is referred here as a somewhat exaggerated type, unique in the collections at hand, not resembling material from Oregon and Washington, which is referable to typical *P. Hydropiper*. CALIFORNIA: moist places in fields in the blue oak belt, 5 mi. so. of Redding, plentiful, *Heller*, no. 12,445 (distributed as *Persicaria punctata*).

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EFFECTS OF THE POST-PLEISTOCENE MARINE SUBMERGENCE IN EASTERN NORTH AMERICA.

H. K. SVENSON.

(*Continued from p. 72.*)

THE POST-PLEISTOCENE SEA IN RELATION TO THE INTERIOR DISTRIBUTION OF MARITIME PLANTS IN EUROPE.

Oceanic submergences in Europe corresponding to the Champlain submergence have been carefully studied, and with these submergences has been correlated the distribution of living plants and plant remains found in the post-glacial and inter-glacial deposits. Most of this work has been done in Scandinavia,[1] by the coöperation of geologists and botanists.

Miss Warburg[2] describes plants of the seashore which survive in the interior of Sweden, probably due to the fact that the sea formerly reached these places. The Mälaren [a lake near Stockholm] was once a bay of the Baltic Sea, and upon its shores still survive plants of the sea coast, such as *Triglochin maritima* and *Juncus Gerardi*. From her I quote as follows: "Besides the plants already mentioned Sernander gives still another example of this kind of relic in the flora

[1] For a survey of Pleistocene and Post-Pleistocene changes of level in Scandinavia, and a brief review of successive plant immigrations see W. F. Wright: The Quaternary Ice Age. 1914.

[2] Warburg, Elsa. On Relics in the Swedish Flora. Geol. Soc. Upsala Bull. 8: 146–170. 1908.

of Upland. In the middle of a flat meadow, a salt spring is situated, the salinity of which is derived from the marine clay of the surroundings. Because of drainage conditions the original seawater salts of the clay have not been quite removed, thus several elements of the old salt-loving vegetation have been able to remain around the spring. We find there not only the Malar relics, *Juncus Gerardi* and *Triglochin maritima,* but also *Glaux maritima* and *Alopecurus ventricosus.*

"*Elymus arenarius* is quoted as another example. It belongs generally to the flora of the seacoast, but is also found at the shores of the [lake] Vettern and Vänern and at some rivers in Norrland. However these occurrences might be due to quite accidental spreading, as this grass also lives in the interior in a place which never in postglacial time has been reached by the sea."

Frödin[1] (p. 36), in a survey of the coastal vegetation of western Sweden, concludes that salt from the Post-Pleistocene marine submergence would not remain in the soil in sufficient quantities to influence the present vegetation.

However, a recent survey[2] of the coast vegetation of Sweden has the following statement: "Most of the species . . . found on shore-meadows, sea drift deposits, or in salt water, are in the interior confined to oecologically similar habitats within the districts of our region richest in nutriment. The localities are to a great extent situated below the highest marine boundary, and it is conceivable that at least some of the species—especially those having a resistant wiry subterranean system and usually uniting into hard associations—might be relicts from former seashores." "*Cynanchum vincetoxicum* and *Poa bulbosa* may probably be interpreted as surviving in the interior from old, higher seashore."

These citations tend to show that in Europe as in North America, the influence of Post-Pleistocene submergence upon the present distribution of the vegetation is somewhat problematical. The extent of submergence from the point of view of fossil plant remains is more significant.[3]

[1] Frödin, John. Tvenne västskandinaviska klimatfaktorer och deras växtgeographiska betydelse. Archiv för Botanik. Band **11**, No. 12: 1–74. 1912.

[2] F. Hård av Segerstad: The main Features of the floral plant-geography of southern Sweden. Bot. Notiser 1925: 222–250. 1925.

[3] For a critical correlation of plant remains with the former extent of the postglacial sea in eastern Sweden, see U. Sundelin: Ueber die spätquatäre Geschichte der Küstengegenden Oestergötlands und Smålands. Geol. Soc. Upsala Bull. **16**: 195–242. 1918–1919.

Investigation of the St. Lawrence Valley and the New Brunswick Salt Springs.

During the summer of 1923, Mr. N. C. Fassett and the writer investigated a region included in the Champlain submergence area, from Burlington, Vermont, to Montreal, and through the St. Lawrence Valley to Matane County, Quebec, thence into New Brunswick by the Matapedia River, along the coast to Moncton, and through the Kennebecasis Valley to St. John and the coast of Maine (Mr. Fassett was engaged in research on estuarine plants, and the writer is indebted to him for the identification of many plants collected during this trip). It was felt that investigation of a region known to have been submerged in the Champlain period—such as the Lower St. Lawrence, or the Kennebecasis Valley of New Brunswick—might disclose features of plant distribution not to be seen farther to the southward. However few, if any, direct evidences were seen of the adaptation or survival of maritime plants inland, under circumstances that would allow one to conclude that they existed merely because of the salt which had remained in marine clays deposited during the Champlain submergence.

Along the south side of the lower St. Lawrence the elevated clay terraces are very prominent, Chalmers[1] recording a subsidence of from 345 to 375 feet in the region below Rivière du Loup, but with the exception of *Euphrasia* and *Juncus balticus* var. *littoralis* noted on the clay banks just west of Trois Pistoles and elsewhere, no maritime plants were seen on these terraces. *Juncus balticus* var. *littoralis* also occurs in fresh meadows in proximity to the ocean and along the tidal shores of the St. Lawrence, extending inland to the Great Lakes.

It is of interest to record the progression of maritime plants along the St. Lawrence River. No attempt was made to trace the exact extension of these plants westward, but at St. Augustine, Portneuf County, appeared *Triglochin maritima;* at St. Michel, Bellechasse County, *Ranunculus Cymbalaria;* at St. Jean-Port-Joli, L'Islet County, *Solidago sempervirens, Limonium trichogonum, Plantago decipiens, Spartina alterniflora, Salicornia europaea, Rumex pallidus, Lathyrus maritimus* and *Atriplex patula* var. *hastata;* at St. Roche des Aulnaies, L'Islet County, *Iris setosa* var. *canadensis, Cakile edentula, Mertensia maritima, Allium Schoenoprasum* var. *sibiricum,* and *Senecio Pseudo-*

[1] Ann. Rept. Can. Geol. Survey. 1886. 8M.

Arnica; and about three miles west of Rivère du Loup, Temiscouata County, *Potentilla pacifica*, *Scirpus nanus*, and *Ammophila breviligulata*. The halophytic vegetation of Temiscouata County is described in detail by Marie-Victorin (l. c.).

The subsidence in the region of the Bay of Chaleurs has been described by Chalmers,[1] but the marine deposits are not so striking as those along the St. Lawrence River. The less severe climate, as the name of the bay would suggest, offers opportunity for the existence of southerly types of both plants and animals, probably due to the great expanse of warm, shallow water, protected from ocean currents. Even oysters flourish here. These southern animals—and very likely the southern plants, such as *Aster subulatus* var. *obtusifolius*—came at a time subsequent to the Champlain submergence (See previous quotation from Upham). The Champlain Sea covered relatively small areas near the coast, and extended up the river valleys. To quote from Chalmers,[2] "There was first a subsidence, which seems to have commenced in the glacial period, continuing until its close or later, the land . . . sinking about 220 feet below its present level relative to the present high tides of the Bay of Fundy. When this subsidence had reached its maximum the coast districts were partially submerged and the isthmus of Chiegnecto almost wholly. One arm of the bay would form a strait along the Petitcodiac and Kennebeckasis valleys, making the longitudinal tract lying to the southeast an island." Accompanying maps show the presence of marine clays and sands throughout the Kennebecasis Valley. Hence, if any single region in New Brunswick should show evidences of the survival of marine plants upon the Post-Pleistocene marine deposits, it seems that the Kennebecasis Valley should be the region, but only *Spartina Michauxiana* which grew commonly on sandy roadsides, often at a fairly high elevation above the Kennebecasis River, was observed. It is possible that here the plant may owe its existence to the marine deposits.

In the Kennebecasis Valley are salt springs which in earlier days were extensively worked. From the largest of these, about four miles northeast of Sussex, salt water flowed from a driven pipe at a considerable pressure, and in the surrounding miniature salt marsh, *Salicornia europaea* grew abundantly. Intermingled with it were

[1] Ann. Rept. Can. Geol. Survey, 1887–1888: 20N.
[2] Ann. Rept. Can. Geol. Survey. 1888–1889. 10N.

Atriplex patula var. *hastata*, *Juncus bufonius* var. *halophilus*, *Spergularia salina*, and a single plant of *Ranunculus Cymbalaria*. Within the influence of the salt, within about twenty meters from the pipe, grew *Agrostis alba* var. *maritima*, *Distichlis spicata*, *Puccinellia paupercula* var. *alaskana*, *Scirpus acutus*, *Scirpus americanus* and *Juncus balticus* var. *littoralis*. It is possible that surface springs may have contributed some salt water to these plants. This was the only locality in which *Juncus balticus* var. *littoralis* was found at a situation remote from the ocean, nor did search reveal it at any other place in the valley.

The other salt springs are less accessible, since they are away from the main avenue of travel. Two of these are found along Salt Spring Creek, about thirty miles southeast of Sussex. At the first of these to be visited, at Salina, salt water trickled from a small depression about five meters from the stream, and communicated to the stream by means of a very small brook, which was nearly dry. About this were growing a few plants of *Atriplex patula* var. *littoralis* and *Agrostis alba* var. *maritima*. No other halophytes were seen. At Salt Springs, a mile to the northward along the same stream, preliminary attempts had been made to produce salt upon a commercial scale. A well was driven and from an iron pipe of about 10 cm. diameter the salt water gushed forth. Although fully as much salt water flowed as in the spring at Sussex, maritime plants with the exception of *Agrostis alba* var. *maritima* were entirely lacking. The ground about the pipe is discolored by iron, and the water soon makes its way to a small brook which cuts through the meadow turf. The lack of halophytes may be due to several causes; namely, the site of the well (which was driven in 1895) may not have been marked by surface springs sufficient to maintain such plants, or drainage might be such that salt-marsh plants would not prosper, or, what seems more reasonable, the recent opening may not have allowed salt marsh plants to arrive there from other parts.

Of these New Brunswick springs Bailey[1] writes, "The rocks of the Lower Carboniferous formation are in several places the scoures of salt springs, as in the vicinity of Sussex in Kings County, at Salt-Spring Brook, parish of Upham, in the same county, and on the Tobique River, in Victoria County. Of these the Sussex springs are the most important. There are half a dozen springs within a radius

[1]Bailey, L. W. Ann. Rept. Can. Geol. Survey. 1897. 121 M, 122 M.

of a quarter of a mile, all about six miles from Sussex station, but less than a mile from the line of the Intercolonial Railway. No attempt has been made to manufacture salt in other localities in the province. Brine springs also occur at Salina. . . . This locality was visited by Mr. R. Chalmers, of the Geological Survey, in 1895, when a boring in the highly inclined Lower Carboniferous rocks had been made to a depth of 330 feet. A specimen of the brine was collected . . . remarkable because of the large proportion of potassium."

Since the springs have been used by man "for nearly a century" it is impossible to decide whether the maritime plants occur naturally there, i. e., as a result of the post-glacial submergence, or whether they have been unconsciously introduced by man in the extraction of salt, or from time immemorial by animals frequenting the salt springs, or by winds or birds. The salt water of the Petitcodiac lies less than forty miles to the northward. It is from that direction that one might naturally expect the transfer of maritime plants.

It is of interest to compare the vegetation of these springs with the vegetation of the salt springs of western New York. A list of such halophytes follows:

Halophytes in western New York.

Ruppia maritima L.
Najas marina L.
Spartina alterniflora var. *pilosa* (Merrill) Fernald
Agrostis alba var. *maritima* (Lam.) Mey.
Diplachne maritima Bicknell
Puccinellia distans (L.) Parl.
Puccinellia fasciculata (Torr.) Bicknell
Eleocharis rostellata Torr.
Scirpus nanus Spreng.
Scirpus campestris var. *paludosus* Fernald.
Juncus bufonius var. *halophilus* Buchenau & Fernald.
Juncus Gerardi Loisel.
Ranunculus Cymbalaria Pursh.
Chenopodium rubrum L.
Atriplex patula L.
Salicornia europaea L.
Spergularia salina J. & C. Presl.
Spergularia marginata (DC.) Kit. (See Rhodora **12:** 157. 1910.)
Spergularia alata Wiegand (See Rhodora **22:** 15. 1920.)
Ranunculus Cymbalaria Pursh.
Aster subulatus Michx.
Aster angustus (Lindl.) T. & G.
Pluchea camphorata (L.) DC.

HALOPHYTES IN THE NEW BRUNSWICK SALT SPRINGS.

Agrostis alba var. *maritima* (Lam.) Mey.
Distichlis spicata Greene
Puccinellia paupercula var. *alaskana* Fernald & Weatherby
Juncus bufonius var. *halophilus* Buchenau & Fernald.
Atriplex patula L.
Salicornia europaea L.
Ranunculus Cymbalaria Pursh.
Spergularia salina J. & C. Presl.

The New Brunswick salt springs support *Distichlis spicata* and *Puccinellia paupercula* var. *alaskana,* neither of which is reported from western New York. A striking contrast appears in the Champlain region in regard to the presence of halophytes, for with the exception of *Atriplex patula,* not uncommon inland as a weed, no true halophytes are found about Lake Champlain. All three regions were probably equally submerged by the Champlain Sea, but in New York and New Brunswick, the halophytes occur in the neighborhood of saline deposits. One therefore comes directly to the conclusion that salt deposited by the Post-Pleistocene marine invasion alone does not support the growth of true halophytes in eastern North America.

(*To be continued.*)

SOME VARIETIES OF ARTEMISIA BOREALIS.

M. L. FERNALD.

ARTEMISIA BOREALIS Pall., var. **latisecta**, n. var., a var. typica recedit foliis rosulatis crassioribus, segmentis oblongis vel oblanceolatis saepe 3–4 mm. latis.—Newfoundland, Labrador and eastern Quebec. NEWFOUNDLAND: talus of trap sea-cliffs, French (or Tweed) Island, Bay of Islands, September 2, 1926, *Fernald, Long & Fogg,* no. 476 (TYPE in Gray Herb.). LABRADOR: Rama, August 20–24, 1897, *Sornborger,* no. 62, in part. QUEBEC: Southwest Point, Anticosti Island, August, 1861, *Hyatt, Shaler & Verrill.*

In typical *Artemisia borealis* and in var. *Purshii* Besser the rosette-leaves are much more finely divided, the linear to narrowly oblanceolate divisions being mostly 0.5–1.5 (rarely 2) mm. wide. Var. *latisecta* has the nearly glabrous involucres of typical *A. borealis* rather than the densely villous involucres of var. *Purshii* Bess. in Hook. Fl. Bor.-Am. i. 326 (1834).

Artemisia borealis, a Purshii, like many other species and varieties published by Besser, had a very confused christening. This arose through the fact that Besser, who was preparing a monograph of the genus, had the good-natured but unfortunate habit of putting out many of his new propositions in a sort of tentative way in the works of other authors and too often with descriptions or synonymy quite unlike those finally published by him. When he *first* published *A. borealis, a Purshii* he described a characteristic plant from Labrador, arctic America and the Rocky Mts. (now also known in Greenland, Newfoundland and eastern Quebec) with villous involucres: "sericea, cinerea; . . . periclinii squamae villosae"; but he appended the citation of the glabrous-headed *A. spithamaea* Pursh, a fact which has led some later authors to infer that the name *A. borealis, a Purshii* was merely a nomenclatorial substitute for *A. spithamaea.* Besser's original treatment, however, suggests that he knew that he was dealing with two quite distinct plants: 1st, *A. borealis, a Purshii,* a cinereous-silky plant with villous involucres; 2d, "A. spithamaea. *Pursh, Fl. Am. v.* 2, *p.* 522; folia prioris glaberrima: . . . periclinii squamae glabrae." Certainly these two extremes occur on the Labrador coast, whence Pursh had his original material, and his description of *A. spithamaea* (1814) indicates that Pursh, as Besser stated, had the plant with glabrous involucres: "calycibus scariosis." These were just the words used by Pursh in describing the glabrous involucre of *A. canadensis* Michx.; but when he had a species with pubescent involucres he definitely so described it: for example, *A. vulgaris* L. "calycibus tomentosis."

In a publication one year later than his original description of *Artemisia borealis, a Purshii,* Besser repeated[1] his diagnosis of the plant with villous involucres and unequivocally cited *A. spithamaea* as a synonym. He appended, however, diagnoses of several noteworthy forms, indicated by letters, and only under these minor forms did he include plants with glabrous involucres. *A. spithamaea,* then, was considered by him as belonging to *A. borealis, a Purshii,* in its inclusive sense, but his diagnosis of the variety was based on something else; and still later, in DeCandolle's *Prodromus,* Besser held tenaciously to the characterization of var. *Purshii* "capitulis extus villosis."[2]

[1] Besser, *Dracunculi seu de sectione IV^{ta} et ultima Artemisiarum Linnaei.* Mosc. Soc. Nat. Bull. viii. 80 (1835).

[2] Bess. in DC. Prodr. vi. 99 (1837).

Besser's treatments were certainly perplexing and Torrey & Gray thought to clarify[1] them, by giving a brand new but unnecessary name to the plant with villous heads: *Artemisia borealis,* "*β Besseri* . . . A. borealis, α Purshii, *Bess.* . . . excl. syn. *Pursh*"; while they correctly treated *A. spithamaea* as a separate variety: "δ *spithamaea:* . . . at length glabrous . . . A. spithamaea, *Pursh! fl.* 2, *p.* 522. (At length glabrous throughout; . .)" Very recently Hall and Clements, merging *A. borealis* with *A. campestris* L., coined the combination *A. campestris,* subsp. *spithamaea* (Pursh) Hall & Clements[2] for the plant with "Involucre densely villous"; but from the facts above stated it should be clear that *Artemisia spithamaea* Pursh was a plant with heads glabrous or essentially so, while the unfortunately named *A. borealis,* α *Purshii* Bess. was repeatedly described by Besser as the plant with villous involucres.

GRAY HERBARIUM.

RAYLESS ASTER MULTIFLORUS.—In the first part of October of this year (1926), while walking through a sandy field here in Groton, I noticed, among the thousands of individuals of *Aster multiflorus* that covered the field, a patch of plants that looked peculiar to me, and upon closer examination I discovered the total absence of ray-flowers in them. Otherwise they had the characters of typical *Aster multiflorus.* There were five or six plants in the colony.

I understand that this is the first mention of this *Aster* without ray-flowers. Specimens are to be deposited in the herbarium of the Connecticut Botanical Society.—K. P. JANSSON, Groton, Conn.

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[1] T. & G., Fl. ii. 417 (1843).
[2] Hall & Clements, Phylog. Meth. in Taxon. 123 (1923).
[3] CARGOES AND HARVESTS by Donald Culross Peattie. 311 pp. New York and London. D. Appleton & Co. 1926. $2.50.

fifteen chapter headings give concisely a suggestion of the themes discussed: Plant Power; The Spices of Ind; Quinine—the Coming of a Savior; The Age of Rubber; The Five O'Clock Cup; The Vanishing Vegetable Dyes; Camphor—the Strategic Crop; The Potato—the Poor Man's Friend; Breadfruit and a Mutiny; The Poppy—Blessing and Curse; Tobacco—the Companionable Weed; The Reign of Cotton; The Tree of the Leper; Our Inherited Crop; Must We Starve?—M. L. F.

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 29. June, 1927. No. 342.

NOTES ON CONNECTICUT LICHENS.[1]

ALEXANDER W. EVANS.

THE "Catalogue of the Lichens of Connecticut," recently published by Miss Rose Meyrowitz and the writer,[2] with the collaboration of Mr. G. K. Merrill, of Rockland, Maine, gave an enumeration of the species known from the State at the close of 1925, with the citation of the towns where each species had been found. During the year 1926, the writer continued his explorations for lichens, as opportunity offered, visiting a number of towns from which no species had previously been reported. On several of his excursions he again profited by the kind coöperation of Dr. G. P. Clinton, of the Connecticut Agricultural Experiment Station, and was thus enabled to collect material in certain more or less remote localities. On another occasion, in company with Mr. F. A. Musch, of New Haven, the region near the mouth of the Connecticut River was studied. The most extensive collections, however, were made in Greenwich, Stamford, and other towns in the southwestern part of the State.

The present paper, in which the results of the 1926 season are recorded, represents a supplement to the Catalogue. The reports for the towns of Old Lyme, Old Saybrook, and Westbrook should be accredited to Mr. Musch and the writer; all the other reports (except in the few cases indicated), to the writer alone. The generous assistance of Mr. Merrill has again been given, and specimens definitely determined by him are marked (as in the Catalogue) by the letter "M." in parentheses. The records thus designated, however, give but an incomplete idea of his help, since nearly all the other

[1] Contribution from the Osborn Botanical Laboratory.

[2] Connecticut Geol. and Nat. Hist. Survey, Bull. 37. February, 1927.

records have been verified by him, although based on the writer's determinations.

The sequence of genera in the list below follows that of Zahlbruckner in the second edition of Engler and Prantl's "Die natürlichen Pflanzenfamilien." In the Catalogue the first edition was followed, since the second was not then available. Fortunately the only difference between the two, so far as the lichens of Connecticut are concerned, is in the position of the families Ephebaceae, Collemaceae, Pannariaceae, Stictaceae, and Peltigeraceae. In the first edition this group of families follows the Acarosporaceae; in the second it precedes the Lecideaceae. The Ephebaceae and Pannariaceae are not represented in the list, but the other three families are represented by the genera *Leptogium*, *Lobaria*, and *Peltigera*, respectively. For the sake of brevity the names of the families and higher groups are omitted, since these are given in full in the Catalogue.

The lichens listed include two species of *Lecanora* and a form of *Cladonia cristatella* which are proposed as new by Mr. Merrill. The descriptions of these new lichens, at the writer's request, were prepared by Mr. Merrill, and the reports from stations outside Connecticut have been largely compiled from his notes. The type specimens are in the Merrill Herbarium.

Dermatocarpon aquaticum (Weis) Zahlbr. Greenwich and Stamford.

Dermatocarpon hepaticum (Ach.) Th. Fr. Darien, the second station for Connecticut.

Dermatocarpon miniatum var. complicatum (Lightf.) Th. Fr. Darien and Woodbridge.

Pyrenula nitida (Weig.) Ach. Stamford.

Trypethelium virens Tuck. Branford, Kent, New Canaan, and Stamford. The only record for this species in the Catalogue was quoted from Hall's report and was based on specimens collected by Barron at Wallingford. These specimens were not seen by the authors. The 1926 material grew on several different kinds of trees.

Arthonia lecideella Nyl. Norwalk and Old Saybrook. Only one station for this species is given in the Catalogue.

Arthonia radiata (Pers.) Ach. Kent, the fourth station for Connecticut.

Graphis scripta f. recta (Humb.) Nyl. Old Saybrook and Stamford.

Graphis scripta f. varia Leight. Stamford (M.).

Crocynia lanuginosa (Ach.) Hue. Greenwich, Hamden (*L. Sudbury*), and Stamford.

Diploschistes scruposus (L.) Norm. Cornwall.

Leptogium tremelloides (L. f.) S. F. Gray. Southbury.

Lobaria amplissima (Scop.) Arn. New Canaan.

Peltigera aphthosa (L.) Hoffm. Stamford.

Peltigera canina (L.) Hoffm. Cornwall and Stamford.

Peltigera polydactyla (Neck.) Hoffm. Stamford (M.).

Peltigera rufescens (Neck.) Hoffm. Salisbury.

Lecidea albocaerulescens (Wulf.) Ach. Cheshire (*Musch*), Darien, Greenwich, New Canaan, New Haven, North Branford (*Musch*), Salisbury, Southbury, and Stamford. The specimens from Cheshire and North Branford were collected in 1925 but, by an oversight, were not reported in the Catalogue.

Lecidea cyrtidea Tuck. Greenwich (M.), the third station for Connecticut.

Lecidea granulosa (Ehrh.) Schaer. Salisbury (M.). These specimens grew on earth among rocks; the two reported in the Catalogue were lignicoline in habit.

Lecidea gregaria Merrill. Darien and Greenwich. This species, which was proposed as new in the Catalogue, has now been found in five Connecticut towns but is not yet known outside the State.

Lecidea platycarpa Ach. Cornwall, the third station for Connecticut.

Lecidea vernalis (L.) Ach. New Canaan, Salisbury, and Stamford.

Bacidia atrogrisea (Del.) Arn. New Canaan (M.), the second station for Connecticut.

Bacidia umbrina (Ach.) Branth & Rostr. Branford and Darien. This species is now known from four Connecticut towns.

Rhizocarpon confervoides DC. Cornwall and Guilford.

Rhizocarpon eupetraeum (Nyl.) Zahlbr. Southbury (M.) and Stamford (*Britton & Evans*, M.). This species is now known from four stations in Connecticut.

Rhizocarpon grande (Floerke) Arn. On rocks. Stamford (*Britton & Evans*, M.). New to Connecticut.

Baeomyces roseus Pers. Greenwich, Meriden (*Musch & Nichols*), and Old Lyme.

Cladonia bacillaris f. clavata (Ach.) Wainio. Kent.

Cladonia Boryi f. reticulata (Russ.) Merrill. Darien (M.), the second station for both species and form from Connecticut.

Cladonia caespiticia (Pers.) Schaer. Greenwich, Milford, and Orange. Only one Connecticut station for this species is reported in the Catalogue.

Cladonia coccifera var. pleurota (Floerke) Schaer. Greenwich, the second Connecticut station for this variety and the fourth for the collective species.

Cladonia cristatella Tuck. Cornwall, Darien, Meriden (*Musch & Nichols*), Milford, North Haven, and Orange.

Cladonia cristatella f. **abbreviata** Merrill, f. nova.

"Thallus well developed and characteristic of the species. Apothecia appearing as if epiphyllous, but podetia sufficiently distinct on careful examination, short, or very short, 1–3 mm. high, the cortex thin, smooth and light colored."

On rotting wood and on banks. Florida: Sanford (*S. Rapp*), type. Connecticut: Milford (*Evans*).

Cladonia cristatella var. vestita Tuck. Greenwich and Kent (M.). The material from the second station, as determined by Mr. Merrill, represents a passage-form between the species and the variety.

Cladonia delicata (Ehrh.) Floerke. Kent and Orange. Only two stations for this species are given in the Catalogue.

Cladonia didyma (Fée) Wainio var. muscigena (Eschw.) Wainio. On decayed wood. Guilford (M.). New to Connecticut. The present material is scanty and is mixed with *C. ochrochlora* m. *ceratodes*.

Cladonia fimbriata (L.) Fr. f. fibula Ach. On banks. Guilford (M.) and Stamford (M.). Hall[1] reported "*C. fimbriata*" from Connecticut and Mr. Merrill doubtfully referred his specimens (which were collected in Killingworth) to f. *fibula*. Owing to their uncertainty and to the fact that *C. fimbriata* is to be regarded as a "composite" species, Hall's specimens were not mentioned in the Catalogue.

Cladonia foliacea var. alcicornis (Lightf.) Schaer. Southbury (M.), the second Connecticut record for this species and variety. In his report on the specimens Mr. Merrill remarks that "very little of the material found in this country compares with the robust European exhibits."

Cladonia furcata (Huds.) Schrad. Woodbridge.

Cladonia furcata var. racemosa m. pinnata (Floerke) Wainio. Kent.

Cladonia glauca Floerke. Cornwall.

Cladonia macilenta Hoffm. var. styracella (Ach.) Wainio. On banks. Stamford (M.), the first Connecticut record for the variety. "*C. macilenta*," however, was cited from Connecticut by Wood,[2] on the basis of specimens collected at Sharon by Green. Since the species is "composite" and since the Sharon specimens were not available for examination, no reference to *C. macilenta* was made in the Catalogue.

Cladonia mitrula Tuck. Milford and Orange.

Cladonia ochrochlora m. ceratodes (Floerke) Wainio. Branford (M.), Greenwich (M.), Milford (M.), and New Canaan (M.). The specimens from Greenwich, as noted by Mr. Merrill, lack apothecia and show an "alien thallus."

[1] Amer. Nat. **11**: 173. 1875.

[2] Torreya **14**: 80. 1914.

Cladonia ochrochlora m. truncata Floerke. New Canaan (M.), the second Connecticut station for this form.

Cladonia pityrea f. scyphifera (Del.) Wainio. On earth over rocks. Greenwich (M.), the first Connecticut station for this form and the second for the species in a collective sense.

Cladonia pyxidata var. chlorophaea Floerke. Cornwall, Greenwich, and Meriden (*Musch & Nichols*).

Cladonia pyxidata intermediate between vars. chlorophaea and neglecta. Darien (M.).

Cladonia rangiferina (L.) Web. Barkhamsted and Cornwall.

Cladonia squamosa m. phyllocoma (Rabenh.) Wainio. Salisbury.

Cladonia squamosa f. squamosissima Floerke. New Canaan (M.), the first Connecticut station for this form.

Cladonia subcariosa Nyl. Greenwich (M.), the second town in Connecticut from which this species has been reported.

Cladonia sylvatica f. laxiuscula Del. Barkhamsted, Greenwich, and Southbury.

Cladonia uncialis f. dicraea (Ach.) Wainio. Barkhamsted, Cornwall, Old Lyme, and Salisbury.

Stereocaulon denudatum Floerke var. caespitosulum Nyl. On earth over rocks. Salisbury (M.), the first Connecticut record for this species.

Stereocaulon paschale var. conglomeratum Fr. On a stone wall. Cornwall (M.), the first Connecticut station for this variety.

Gyrophora Dillenii (Tuck.) Müll. Arg. Barkhamsted.

Gyrophora Muhlenbergii Ach. Barkhamsted, Cornwall, and Salisbury.

Umbilicaria pustulata var. papulosa (Ach.) Tuck. Barkhamsted and Salisbury (*Britton*).

Biatorella simplex (Dav.) Branth & Rostr. Darien and Old Lyme (M.).

Acarospora fuscata (Schrad.) Arn. Old Lyme.

Pertusaria amara (Ach.) Nyl. Old Saybrook, the fourth station for Connecticut.

Pertusaria ceuthocarpa (Sm.) Turn. & Borr. New Haven and Roxbury. This species, reported for the first time from America in the Catalogue, is now known from four stations in Connecticut.

Pertusaria multipuncta (Turn.) Nyl. Barkhamsted and Greenwich.

Pertusaria pustulata (Ach.) Nyl. Kent (M.).

Lecanora Bockii Th. Fr. Old Lyme (M.), the second station for Connecticut.

Leconora cinerea (L.) Sommerf. Southbury.

Leconora gibbosa (Ach.) Nyl. Darien (M.) and Old Saybrook (M.). The species is now known from four Connecticut towns.

Lecanora pallida (Schreb.) Schaer. Old Saybrook.

Lecanora **riparia** Merrill, sp. nov.

"Saxicoline form. Thallus spreading, imposed on a whitish hypothallus and thus quasi-effigurate, thin with the hypothallus here and there visible, or thickened and granulose-verruculose, gray, sordid-gray, or cinereous; KOH ±, CaCl —. Apothecia variable in size, 1–4 mm. in diameter, round with an entire or subcrenulate thalline margin, the disc reddish brown to chestnut, plane with a conspicuous margin or convex with the margin reflexed. Spores 8-nae, 13–17 × 7–10 μ, ellipsoid with a thickened epispore; asci inflated; paraphyses somewhat thickened, unbranched. Hymenial gelatine I + blue, the color persisting except in thin sections, then wine-red. On various rocks and ledges, in every case just above the water level in tidal rivers or inlets, at times submerged or within reach of spray.

"Lignicoline form. Thallus spreading, in forms liable to submergence inconspicuous, when found on drifted wood in a situation at or above the upper limit of tidal influence, commonly somewhat thickened and verruculose-granulose. Apothecia 1–4 mm. in diameter, the margin conspicuous and flexuous or round and entire. Spores and other internal characters as in the rock forms.

"Corticoline form. Thallus commonly slightly thickened, but in other respects resembling in all of its characters the lignicoline states."

Maine: "on schistose rocks," Rockport (*Merrill*), type; "on greenstone," North Haven (*Merrill*); "on calciferous schist, and also on fence posts, erect or thrown down in a muddy flat," Cushing (*Merrill*); "on peridotyte," Freeport (*A. H. Norton*); "on decorticated trees and shrubs of a sea-cliff," Matinicus Island (*Merrill*); "on dead wood, near level of water in a tidal stream," Thomaston (*Merrill*), distributed in Lichenes Exsiccati, No. 24. Connecticut: on rocks and on an old post near salt water, Old Lyme (*Evans & Musch*); on rocks and on oak trees near the beach, Darien (*Evans*). Washington: "decorticated logs in a tide-flat," Sequim Bay (*J. M. Grant*); "decorticated drift logs," Dungerness (*A. S. Foster*).

"Very near *Lecanora subfusca* var. *campestris* Schaer., but the apothecia average larger and the paraphyses are thicker; the halophytic habit, moreover, argues for distinctness."

Lecanora subfusca (L.) Ach. Southbury (M.); two specimens, one from bark being "near v. *chlarona*," and the other from rocks representing a "forma," according to Mr. Merrill.

Lecanora subfusca var. campestris Schaer. Southbury, the second town in Connecticut from which this variety has been reported.

Lecanora **subpallida** Merrill, sp. nov.

"Plant corticoline. Thallus orbicular, sub-effigurate, imposed on a white hypothallus, sordid cinereous, more or less smooth and even, or granulate, or verruculose-granulate, the granules small; KOH + > crimson. Apothecia small to at length medium, borders ir-

regularly flexuous, plane with a distinct thalline margin, or tumid and convex with the margin decurved, commonly gray or caesious-pruinose. Spores 8-nae, ellipsoid with a thickened spore wall, 12–16 × 6–7 μ; asci ventricose."

"Widely diffused on the bark of various trees but not recognized, often identified as a sordid *Lecanora pallida;*" rarely on old wood. MASSACHUSETTS: Wareham (*C. A. Robbins*), TYPE; Ellis (*G. P. Clinton*). CONNECTICUT: Old Lyme (*Evans & Musch*). ALABAMA: Millersville (*Pollard & Maxon*); Fairhope (*Evans*). BRITISH COLUMBIA: Goldstream, Vancouver Island (*J. Macoun*). CALIFORNIA: Santa Catalina Island (*L. W. Nuttall*).

LECANORA VARIA (Ehrh.) Ach. Darien, Old Lyme, and Old Saybrook.

OCHROLECHIA TARTAREA (L.) Mass. Stamford (M.)

CANDELARIELLA VITELLINA (Ehrh.) Müll. Arg. Branford, Cornwall, Darien, Milford, and Old Lyme.

PARMELIOPSIS ALEURITES (Ach.) Cromb. Barkhamsted, Cornwall, Old Lyme, and Orange.

PARMELIA AURULENTA Tuck. Greenwich, Guilford (M.), New Canaan (M.), and Stamford (M.). Only one collection of this species was reported in the Catalogue.

PARMELIA CAPERATA (L.) Ach. Barkhamsted, Greenwich, New Canaan, Norfolk, Old Lyme, Old Saybrook, and Southbury.

PARMELIA CONSPERSA (Ehrh.) Ach. Norfolk, Southbury, and Stamford.

PARMELIA CONSPERSA f. ISIDIATA (Anzi) Hue. Darien, Greenwich and Woodbridge.

PARMELIA OLIVARIA (Ach.) Hue. Kent and Salisbury.

PARMELIA PERFORATA (Jacq.) Ach. Old Lyme.

PARMELIA PHYSODES (L.) Ach. Cornwall and Old Lyme.

PARMELIA RUDECTA Ach. Branford, Cornwall, Kent, New Canaan, Norwalk, Old Saybrook, Southbury, and Stamford.

PARMELIA SAXATILIS (L.) Ach. Cornwall, the fifth station for Connecticut.

PARMELIA SUBAURIFERA Nyl. Cornwall and Old Lyme.

PARMELIA SULCATA Nyl. Greenwich (M.), New Canaan, Norfolk, Old Lyme, Salisbury, and Stamford.

PARMELIA TILIACEA var. SUBQUERCIFOLIA (Hue) Merrill & Burnham. Old Saybrook (M.), the third station in Connecticut for this variety.

PARMELIA TILIACEA var. VICINIOR (Hue) Merrill. Kent, the third town in Connecticut from which this variety is now known.

CETRARIA OAKESIANA Tuck. Salisbury (M.), the third station for Connecticut.

NEPHROMOPSIS CILIARIS (Ach.) Hue. Cornwall (M.).

ALECTORIA CHALYBEIFORMIS (L.) S. F. Gray. Norfolk and Old Lyme.

Caloplaca aurantiaca (Lightf.) Th. Fr. Norwalk and Old Lyme.

Caloplaca aurantiaca var. erythrella (Ach.) Nyl. Darien and Roxbury (M.).

Caloplaca cerina var. siderites (Tuck.) Merrill & Burnham. Darien (M.) and Kent (M.).

Caloplaca pyracea (Ach.) Th. Fr. Old Saybrook, the fourth Connecticut station for the species.

Xanthoria lychnea (Ach.) Th. Fr. Greenwich, Norwalk, Old Saybrook, Salisbury, Southbury, and Stamford.

Xanthoria parietina (L.) Th. Fr. Old Saybrook.

Buellia colludens (Nyl.) Tuck. On rocks. Southbury (M.). The specimens are not typical but are referred provisionally to this species by Mr. Merrill. This is the first record for Connecticut.

Buellia conspirans (Nyl.) Wainio. Kent and Old Saybrook.

Buellia disciformis var. saxicola Oliv. On rocks. Greenwich (M.) and Old Lyme (M.). The variety is new to Connecticut.

Buellia myriocarpa (DC) Mudd. Old Saybrook.

Rinodina oreina (Ach.) Mass. Cornwall, Darien, Old Lyme, and Westbrook.

Rinodina sophodes (Ach.) Th. Fr. On rocks. Woodbridge (M.), the first definite Connecticut record for the species. As shown in the Catalogue *R. sophodes* var. *confragosa*, as listed by Hall, is now regarded as a distinct species, under the name *R. confragosa* (Ach.) Koerb.

Pyxine sorediata (Ach.) Th. Fr. Norwalk, Southbury, and Stamford.

Physcia aquila var. detonsa (Fr.) Tuck. Kent and Stamford.

Physcia obscura var. endococcina (Koerb.) Th. Fr. Barkhamsted, Branford, Cornwall, Greenwich, Kent, Old Lyme, Orange, Salisbury, and Southbury.

Physcia obscura var. virella Leight. On trees. Barkhamsted, the first Connecticut record for this variety.

Physcia pulverulenta var. leucoleiptes Tuck. On trees. Old Saybrook (M.), Norwalk (M.), and Southbury (M.). This variety is here reported from Connecticut for the first time.

Physcia stellaris (L.) Nyl. Cornwall, Greenwich, New Canaan, Norwalk, Old Lyme, Old Saybrook, Southbury, and Stamford.

Physcia stellaris var. aipolia Nyl. On trees. Greenwich (M.), the first Connecticut station for this variety.

Physcia tenella (Scop.) Nyl. Old Saybrook.

Physcia tribacia (Ach.) Nyl. Darien, Greenwich, New Canaan, Norwalk, Old Saybrook, Southbury, and Stamford.

Anaptychia speciosa (Wulf.) Wainio. Kent, the fifth station for Connecticut.

In the Catalogue 301 "lichen-forms," representing 231 distinct species, are enumerated. The additions included in the preceding

list increase the number of lichen-forms, now known from the state, to 318 and the number of species to 240.

In the Catalogue records from 79 Connecticut towns were given, leaving 90 towns from which no reports on lichens had been received. The explorations of 1926 give records from 9 additional towns, reducing the number still to be heard from to 81. In the Catalogue the towns from which 10 species or more had been reported numbered 36; to these towns the following, 7 in number, may now be added: Greenwich, Kent, New Canaan, Old Saybrook, Salisbury, Southbury, and Stamford. The 5 towns standing at the head of the list, with the number of species recorded from each, are as follows: Killingworth, 95; Guilford, 53; New Haven, 52; Bethany, 51; and Washington, 46.

In the Catalogue only 5 species were reported from 20 or more towns apiece, while 22 were reported from 10 to 20 towns apiece. These numbers may now be raised to 10 and 27, respectively. The 10 leading species of the state, according to the present records, with the number of towns from which each species has been reported, are the following: *Parmelia caperata*, 36; *P. rudecta* and *Physcia stellaris*, 30 each; *Cladonia cristatella* and *Parmelia conspersa*, 28 each; *Physcia obscura*, 26; *Ph. tribacia*, 24; *Cladonia furcata*, *C. sylvatica*, and *Lecidea albocaerulescens*, 21 each. In the Catalogue the leading species, *Parmelia caperata*, had only 29 towns to its credit. The species, additional to those noted in the Catalogue, which are now known from 10 or more towns apiece, are the following: *Alectoria chalybeiformis*, *Candelariella vitellina*, *Cladonia rangiferina*, *C. uncialis*, *Dermatocarpon aquaticum*, *Gyrophora Muhlenbergii*, *Pertusaria pustulata*, *Physcia aquila*, *Ph. pulverulenta*, and *Rinodina oreina*.

Yale University,
New Haven, Connecticut.

EFFECTS OF POST-PLEISTOCENE SUBMERGENCE IN EASTERN NORTH AMERICA.

H. K. Svenson.

(*Continued from p. 93.*)

Halophytes occurring on the Atlantic Coast and in the Saline Regions of Western North America.

Before discussing the Champlain Sea as a means of dispersal of halophytes, it may be well to consider the distribution of halophytes

which occur on the Atlantic coast and also in the regions west of the Great Lakes. St. John and Courtney[1] have recently described the striking similarity or identity of plants about a saline lake in Okanogan County, Washington, with those inhabiting the salt marshes of the sea coast. Upham,[2] in 1890, listed the plants about the saline springs in the Canadian Northwest, and from him the following quotation and list is made. "The following plants peculiar to the seashore and its salt marshes, not found elsewhere in the Eastern States and Provinces, excepting some of them at salt springs in New York and along the shores of the Great Lakes, reappear in abundance on the saline and alkaline soil in certain parts of the Red River Valley, and of the western prairies and arid plains:

Buda marina Dumort [*Spergularia* sp.]
Glaux maritima L.
Heliotropum Curassavicum L.
Plantago eriopoda Torr.
Chenopodium rubrum L.
Atriplex patulum L. var. *hastatum* Gray.
Salicornia herbacea L.
Salsola Kali L.
Rumex salicifolius Weinmann [*R. mexicanus* Meisn.]
Rumex maritimus L. [var. *fueginus* (Dusén) Phil.]
Triglochin maritima L.
Scirpus maritimus L. [*S. campestris*, var. *paludosus* (A. Nels.) Fern.]
Distichlis maritima Raf. in its var. *airoides* Vasey [Probably *Puccinellia airoides* Wats. & Coult. or *P. Cusickii* Weatherby. See Rhodora **18:** 181–183. 1916.]
Hordeum jubatum L.

[To the above enumeration may be added *Scirpus rufus* (Huds.) Schrad., and *Plantago oliganthos* R. & S., both of which are represented by specimens in the Gray Herbarium.]

Coville[3] reports a somewhat similar group of halophytes and indifferent halophytes from Death Valley, including such plants as *Typha angustifolia*, *Triglochin maritima*, *Zannichellia palustris*, *Ruppia maritima*, *Eleocharis rostellata*, *Scirpus acutus*, *Scirpus campestris* and *Ranunculus Cymbalaria*. As an additional illustration of the occurrence of western halophytes in eastern America may be noted the occurrence about the Gulf of St. Lawrence of *Erigeron lonchophyllus*, *Aster angustus*, and *Aster laurentianus*, endemic representa-

[1] St. John, Harold and W. D. Courtney. The Flora of Epsom Lake. Am. Journ. Bot. **11**: 100–107. 1924.

[2] Upham, Warren. Geographic Limits of species of plants in the basin of the Red River of the North. Boston Soc. Nat. Hist. Proc. **25**: 140–172. 1890.

[3] Coville, F. V. Botany of the Death Valley Expedition. Cont. U. S. Nat. Herb. **4**: 1893.

tive of *A. frondosus.*[1] The significance of the distribution of these halophytes of the Atlantic coast in western North America will be considered under the following headings.

The interior Distribution of Halophytes by Factors other than the Champlain Sea.

Other factors than the Champlain Sea are involved in the interior distribution of the halophytes and indifferent halophytes. These may be summed up as transportation factors (canals, railroads, winds and birds), environmental factors (temperature, marl and limestone deposits, and drainage conditions).

1. Transportation by canals and railroads.—The early decades of the nineteenth century saw a great increase in transportation, initiated by the building of canals, soon followed by railroads. The Erie Canal, opened in 1825, established a waterway from the sea to the Great Lakes by way of the Mohawk Valley, and with the Champlain and Oswego Canals forms a series of canals traversing New York State, bringing into continuous waterway communication Lake Champlain, the Atlantic Ocean and the Great Lakes. It seems inevitable that canal boats in passing up the Hudson River should have carried with them plumed seeds of *Typha angustifolia* and *Scirpus fluviatilis,* seeds of mud-loving plants, as *Eleocharis diandra,* and occasionally the seeds of true halophytes. To-day, in the old Erie Canal bed between Amsterdam and Fort Hunter, one may see *Typha angustifolia* and *Phragmites communis* struggling along under what are obviously unsuitable conditions, and since these plants are not noted in the adjacent Mohawk River, one comes to the conclusion that they were dependent upon the canal for their presence. To what extent canals and railroads have been effective in the transfer, however, of halophytes into western New York, can only be conjectured. A few, for example, *Triglochin maritima* and *Eleocharis rostellata,* occur in bogs remote from transportation routes, and many were recorded by Pursh and by Torrey[2] before the advent of canals and railroads. Pursh[3] mentions

[1] See Rhodora **12**: 225–227. 1910, and **16**: 57–61. 1914.

[2] Torrey, John. Flora of New York. 1843.

[3] Pursh, Frederick. Journal of a Botanical Excursion in the Northeastern part of the State of Pennsylvania and New York, during the year 1807. Philadelphia, 1869. See page 54. For a review of early Jesuit accounts of the Onondaga salt springs and development of the salt fields, see F. J. H. Merrill: Salt and Gypsum Industries of New York. N. Y. State Mus. Bull. **11**: 1893.

in 1807 the presence of *Samolus floribundus, Salicornia europaea, Triglochin maritima, Ranunculus Cymbalaria* and *Hibiscus Moscheutos* in the marshes about Onondaga Lake. Yet salt manufacture was being carried on at that early period, and for over a century the springs had been visited by Jesuits and Indians coming often from remote distances, and who in their incursions in the quest of salt may unconsciously have carried about with them the seeds of maritime plants.

That these halophytes are easily and rapidly spread may be seen from observations on *Potamogeton crispus* by Hull,[1] and from Farwell's notes on the occurrence of *Salicornia europaea, Aster subulatus,* and *Pluchea camphorata* about the salt works in Michigan. To quote from Farwell,[2] "We can only surmise that they may have been brought west by means of railway freight traffic and when lodgement was made in this section, which provided the proper saline conditions suitable for their development, they persisted and have made flourishing colonies that are rapidly extending over the entire section which has been made saline by means of the escaping waters from the mine and the salt crushers." Similarly Fernald and Wiegand[3] record the introduction of *Spergularia marginata* on the saline borders of Onondaga Lake, and Wiegand[4] has recently described a new species, *Spergularia alata* from central New York.

2. Transportation by winds and birds.—Of transportation by winds but little can be said, except that under present climatic conditions, transportation of maritime plants into the Great Lakes from the seacoast, would tend to be slightly reduced, since moist east winds would tend to hinder the passage of plumed seeds. With the influence of salt carried by ocean winds upon the interior distribution of plants, the writer proposes to deal in a succeeding paper.

As regards seed transportation by birds, we are concerned in the comparatively small area included under the Champlain submergence, not with bird migrations, but with more or less customary inland flights. Birds in migrating over long distances do not, as a rule, carry seeds,[5] but it is conceivable that aquatic resident birds, such

[1] Hull, Edwin D. Advance of *Potamogeton crispus.* Rhodora **15**: 171–172. 1913.

[2] Farwell, O. A. New Ranges for Old Plants. Rhodora **18**: 243–244. 1916.

[3] Rhodora, **12**: 157–163. 1910.

[4] Rhodora, **22**: 15–16. 1920.

[5] For a discussion of this subject see M. L. Fernald: Botanical Expedition to Newfoundland, Rhodora **13**: 143–145, 1911, and Theodore Holm: Canadian Arctic Expedition, 1913–1918, **5**: 79B, 80B, and 112B. 1922.

as gulls, might do so, and if seeds were carried it might be expected that those of halophytes would be present. Seagulls come far inland in the regions occupied by the Champlain Sea; the writer has observed them in the Mohawk River near Schenectady, on the Lamoille River near Montpelier, Vermont, and on the St. Lawrence River, some miles above Quebec.

Bailey[1] describes the presence of diatoms belonging to marine genera in the saline lakes of Saskatchewan. Though their presence has been suggested as being due to migratory birds, it is found that the species are unlike those of the Atlantic or Pacific seaboard.

3. THE INFLUENCE OF LIMESTONE AND MARL DEPOSITS.—In a previous note mention was made of indifferent halophytes which were characteristic of calcareous areas. Such plants might be exemplified by *Potamogeton Friesii, P. filiformis, P. pectinatus, Myriophyllum exalbescens,* and *Sagittaria heterophylla,* which in New England and the Maritime Provinces are confined to brackish lagoons and river estuaries along the coast and to interior calcareous regions such as Berkshire County in Massachusetts, Coos County in New Hampshire, and Aroostook County in Maine. St. John[2] makes similar observations of plants on the Labrador coast growing in proximity to the seashore but otherwise confined to calcareous regions of the interior. Professor Fernald records the presence of *Juncus balticus* var. *littoralis* and *Triglochin maritima* in the upper St. John Valley of Maine, and describes as follows the vegetation of Caribou Bob in Crystal, Aroostook County,[3] "we note that the peculiar association of species which is found on Caribou Bog (and so far as we know on no other bog of New England) is repeated in many of its details on the famous Bergen Swamp in Genessee County, New York, a swamp which 'has long been considered one of the most interesting botanical points in western New York,' and in similar marshes in Wayne County, New York . . . These three bog-areas, then, are very similar in their vegetation and are characterized by a remarkable aggregation of rare or local species derived from very dissimilar floras: some of the species being characteristic of the prairies of the interior, others as typical of the Atlantic coast or even of our salt marshes; some well known northern calciphile, others ordinarily

[1] Bailey, L. W. An Annotated Catalogue of the Diatoms of Canada showing their Geographical Distribution. Contributions to Can. Biol. 2: 31–68. 1924.

[2] Can. Dept. Mines. Memoir 126: 36. 1922.

[3] RHODORA 12: 118, 119. 1910.

as distinctly calcifuge species. The association of these plants, especially such species as *Triglochin maritima, Phragmites communis, Scirpus caespitosus, Tofieldia glutinosa, Habenaria leucophaea, Arethusa bulbosa, Drosera linearis,* and *Lonicera oblongifolia,* some of which are entirely unknown on other bogs of New England and New York, indicates some common feature of these bogs which it will be very enlightening to work out. A somewhat similar association of plants, with a slight variation in the exact species, occurs in some of the marly bogs on the coast of the Gaspé peninsula, where there is a remarkable mingling of marl-swamp types with the characteristic plants of sphagnum bogs and even of brackish or saline shores."[1]

It is, however, not so remarkable to find plants of the seacoast occurring in calcareous regions, for limestones have essentially been formed in marine waters and unless greatly metamorphosed should contain and liberate by solution most of the salts normally found in coastal lagoons and estuaries. Drainage in these areas is apparently significant. It is the writer's experience that where rapid drainage of water occurs, as, for example, the underground drainage in the limestone region of Middle Tennessee and Kentucky, these indifferent halophytes are practically absent. We may infer that the glacial period, in which moraine of various types was deposited, resulting in the formation of lakes and swamps, and the deviation of river channels, brought about conditions more favorable for the spread of the indifferent halophytes such as *Scirpus* and *Potamogeton* than may have occurred in the period immediately preceding glaciation. Such regions of deposition accumulate salts and provide quiet waters suitable for plant growth; moreover such areas close to sea-level would tend to be submerged by a marine invasion such as the Champlain submergence. Herein seems to be a solution of the problem. Granting that indifferent halophytes follow to some extent the area of the Champlain submergence, their presence is undoubtedly to be attributed to the fact that they are occupying deposition areas which afford the necessary salts and an environment somewhat similar to the brackish regions adjacent to the coast.

Routes of migration of halophytes into the Great Lakes.—Since the early botanists stressed the idea that vegetation within the limits of the ice sheet had disappeared during glacial time and

[1]For observations on these swamps of New York, see Metcalf & Griscom, Rare New York State Plants, Rhodora **19**: 28-37, 48-55. 1917; and Beckwith & Macauley, Plants of Monroe County, New York, Proc. Rochester Acad. Sci. **3**:1-150 1894.

that plant migration into this area ensued when the ice had sufficiently withdrawn, the question presents itself as to the routes by which these halophytes reached the Great Lakes. Like the bog plants just mentioned, these so-called maritime plants do not represent a homogeneous group, but are composed of representatives of various types, true psammophytes, such as *Ammophila breviligulata, Euphorbia polygonifolia*, and *Hudsonia ericoides;* psammophilous halophytes, such as *Lathyrus maritimus, Juncus balticus* var. *littoralis*, and *Cakile edentula;* plants boreal in distribution, such as *Triglochin maritima* (south along the coast to New Jersey), *Triglochin palustris* (south to New Hampshire), and *Ranunculus Cymbalaria* (south to Connecticut); and plants of southern distribution coming north to New England or southern Nova Scotia, as *Hibiscus Moscheutos* and *Eleocharis rostellata.* It is scarcely to be considered that all migrated simultaneously, but that boreal types, corresponding to the arctic fauna of the Champlain Sea, first made their appearance (See Antevs, l. c., p. 90–91), followed by southern types. Although no definite facts can be established, due to the paucity in America of fossil plants of this period, yet three main routes of migration present themselves, as follows:

1. By railway and canal from the Atlantic seaboard, through the Mohawk Valley, a topic which has already been discussed with reference to *Spergularia marginata, Potamogeton crispus, Aster subulatus, Pluchea camphorata*, and others.

2. By the St. Lawrence Valley. This is the natural route for psammophytes such as *Ammophila breviligulata*, which penetrate inland along sandy shores, and which Kearney (l. c.) has shown are not halophytes; and for true halophytes which may have been introduced by the Champlain Sea, although it is doubtful whether the Champlain Sea was greatly instrumental in the introduction of halophytes into the Great Lakes region. Many halophytes such as *Eleocharis rostellata, Juncus Gerardi*,[1] *Spartina alterniflora* var. *pilosa*, and *Najas marina* do not occur northward to the Gulf of St. Lawrence, and the same is true of indifferent halophytes, notably *Hibiscus Moscheutos, Samolus floribundus*, and *Typha angustifolia. Ruppia maritima*,[2] *Scirpus nanus, Scirpus campestris* var. *paludosus*,

[1] *Juncus Gerardi* occurs in eastern Newfoundland. The citation from Vermont (See Gray's Manual 7th ed. p. 270) was based upon plants derived from discarded packing material.

[2] See Fernald, M. L. & K. M. Wiegand. The Genus *Ruppia* in Eastern America. Rhodora **16**: 119–127. 1914. On page 126 is a description of var. *onondagensis*

Salicornia europaea and *Chenopodium rubrum* remain as true halophytes which may possibly have been introduced into the region of the Great Lakes by the Champlain Sea, but there is no evidence, except perhaps in the case of *Ruppia* (see footnote). It has been clearly shown that marine waters did not occupy the Hudson Valley during this period, and therefore natural introduction of maritime plants by this route is out of the question.

Fig. 1. North American range of Ranunculus Cymbalaria.

3. From regions adjacent to the glaciated area.

There is the possibility that many plants native to the saline regions of central New York during the last interglacial period survived in regions adjacent to the advancing or retreating ice, wherever salt was contributed by springs or moraine. What seems more probable, however, is that plants of boreal tendencies, such as *Triglochin maritima*, *Triglochin palustris*, and *Ranunculus Cymbalaria* (see fig.

---

from Onondaga Lake. "From var. *subcapitata* which is apparently frequent about the Gulf of St. Lawrence, it is at once distinguished by its long peduncle; but its podogynes and fruits so closely resemble those of the latter plant as to suggest that var. *onondagensis* is a derivative of the maritime var. *subcapitata* which has become slightly altered in its isolated inland habitat.

1), which have by far their greatest distribution in western America, migrated eastward. The similarity of the present halophilous vegetation of the West with that of central New York and the Atlantic coast, has already been stressed by Upham (l. c.) and by St. John (l. c.). At the time of recession of the ice sheet, a great area with homogeneous temperature and humidity must have extended along the front of the retreating ice with a terrain adapted to the growth of aquatic or semi-aquatic plants, and in alkaline regions to halophilous plants, making possible an extensive west to east as well as south to north migration. Upon retreat of the ice cap, relics of the northern saline types would thus be left in mountainous regions, about saline springs, or in cold calcareous bogs. A similar expansion of more southern halophytes and indifferent halophytes would naturally follow. From this point of view it seems as logical to consider *Ranunculus Cymbalaria* at Onondaga Lake as the most eastern station of an extensive area in the west as to consider it an interior migrant from the Atlantic seaboard.

The origin of the halophytic flora of the Great Lakes, therefore, appears to be complex, involving not only the question of post-Pleistocene submergence, but also the question of postglacial migrations from the West, and of apparently most importance, transportation by human agencies.

Summary.

From review of literature and from investigation the writer finds that maritime plants (halophytes) do not persist inland in eastern North America by reason of the post-Pleistocene marine submergence, unless salt springs or equivalent conditions are present, as in certain regions of New York and New Brunswick. No vascular plants of characteristically brackish habitat (indifferent halophytes) appear to be confined throughout their distribution in New England and the Maritime Provinces to the region occupied by the marine submergence, but their distribution inland is usually confined to low lying areas adjacent to the sea, or to inland areas with impeded drainage where the underlying rocks are calcareous. The botanical evidence of oceanic submergence offered by early writers is of little value It does not seem that maritime plants (halophytes) have by natural means entered the Champlain or Ontario basins by way of the Hudson valley, but that they have come partly by way of the Gulf of St.

Lawrence and partly from the west and southwest after sufficient removal of the ice to the northward. Human agencies have been perhaps the most effective means of distributing these plants.

UNION COLLEGE, SCHENECTADY, NEW YORK.

THE VALIDITY OF THE GRASS GENUS DIGITARIA.

A. S. HITCHCOCK.

DIGITARIA, as generally accepted (for a genus or a section of *Panicum*) for the last hundred years, has included *Panicum sanguinale* L. and its allies. *Digitaria* was rejected by Nash[1] because it was thought to be a homonym of *Digitaria* "Heister (Adans. Fam. Pl. **2:** 38. 1763)," and *Syntherisma* was accepted in its place. A re-examination of the evidence shows that *Digitaria* should be accepted as valid, *Panicum sanguinale* L. being selected as the standard species.

The first use of the name *Digitaria* was by Fabricius[2] where it is credited to Heister, "Digitaria Heist.; Dactylis Rai. Gramen dactylon majus panicula longa, spicis pluribus nudis crassis. Sloane." The Sloane reference given by Fabricius is cited by Linnaeus[3] under *Panicum dissectum*. Under the American Code *Panicum dissectum* has been assumed to be the type of *Digitaria* Heist. because the two names are "associable by citation," which fact also established effective publication under that code. In an investigation of the Linnaean types of American grasses[4] it was found that the Sloane reference was cited by Linnaeus under *Paspalum virgatum* in 1759, as well as under *Panicum dissectum* in 1753. The specimen in the Sloane Herbarium is *Paspalum virgatum*.

I think this reference of Sloane's plant to *Digitaria* by Fabricius should be considered an error, a misidentification. The identification was doubtless made from the plate in Sloane's work. European botanists at that time had a very vague idea of the tropical American flora and too much weight should not be given to the citation of exotic references. It appears that Fabricius himself recognized his error for in the second edition of his work[5] he omits the Sloane refer-

[1] Britt. & Brown. Illustr. Fl. **1:** 110. 1896.
[2] Fabr. Enum. Pl. Hort. Helmst. 207. 1759.
[3] Sp. Pl. 57. 1753.
[4] Hitchcock, Contr. U. S. Nat. Herb. **12:** 133. 1908.
[5] Fabr. Enum. Pl. Hort. Helmst. ed. 2. 374. 1763.

ence, which he replaced by a synonym from Clusius and by a description, both of which refer to *Panicum sanguinale*. In the original edition the first reference is "Dactylis Rai." Ray[1] has no group called *Dactylis;* but under the heading "*De Gramine Dactyloide seu Ischaemo*" (obviously what Fabricius referred to) are included a number of grasses with digitate inflorescence (*Andropogon hirtus*, *Cynodon dactylon*, and others) one of which was later described by Linnaeus as *Panicum sanguinale*. Taking Fabricius' reference to Ray, instead of that to Sloane, as the basis of *Digitaria* Heist., we find *Panicum sanguinale* to be one of the elements of the group, and probably the only one in the region covered by Fabricius' flora.

Taking all these facts into consideration it seems reasonable to select *Panicum sanguinale* as the type of *Digitaria* Heist., although the genus was not yet effectively published.

The next use of *Digitaria* was by Adanson,[2] who credits the name to Heister. The tabulated characters used by Adanson are vague but from his group characters and from the index it is evident that he had in mind, in part at least, *Tripsacum* and *Coix*. Since Adanson does not propose a new genus but credits the name to Heister his use of *Digitaria* should be regarded as a misapplication, not the publication of a new genus.

Haller[3] gives a generic description of *Digitaria*, crediting the name to Heister and Adanson, and including *Panicum sanguinale* L. and *P. dactylon* L. (*Cynodon dactylon*) but not giving binomial specific names.

Four years later Scopoli[4] describes "DIGITARIA HEIST. ADANS. HALL." and includes the two species described by Haller, giving them the specific names *D. sanguinalis* and *D. dactylon*. This is the first adequate publication of the genus, which should be cited *Digitaria* Heist.; Scop. Fl. Carn. ed. 2. **1**: 52. 1772.

Persoon[5] separated the two elements, retaining *Digitaria* for *Panicum sanguinale* and its allies and giving the new generic name *Cynodon* to *Panicum dactylon*.

In the preceding paragraphs I have given the facts concerning *Digitaria* and have indicated my judgment as to the best method of

1 Hist. Pl. **2**: 1271. 1688.
2 Fam. Pl. **2**: 38, 550. 1763.
3 Hist. Stirp. Helv. **2**: 244. 1768.
4 Fl. Carn. ed. 2. **1**: 52. 1772.
5 Syn. Pl. **1**: 84. 1805.

disposing of the case, namely, to accept *Panicum sanguinale* L. as the type species of *Digitaria* as used by Fabricius, by Adanson, and by Scopoli. However, I realize that not all botanists may agree with me in this. Some may insist that *Digitaria* Heister should be typified by *Paspalum dissectum* L.; others may feel that *Digitaria* as used by Adanson should rest on the description and synonymy even though Heister is cited as the author of the name. In either case *Digitaria* as used by Scopoli becomes a homonym. To insure the use of *Digitaria* in the sense of Scopoli, I would therefore suggest that *Digitaria* in the latter sense be added to the list of Nomina Conservanda.

Washington, D. C.

Josselyn Botanical Society.—The thirty-second Annual Field Meeting will be held July 11th to 15th, 1927, at Atlantic House, Milbridge, Washington County, Maine. Rates $3.50 per day. Milbridge, on the Narraguagus River, is near Narraguagus Bay and furnishes collecting on exposed coasts, saltmarshes, sheltered shores, and inland streams, marshes and bogs. Members and guests wishing to attend should notify Mr. George Bloch, proprietor of the Atlantic House, as early as possible. The usual programme of the society, daily collecting trips, with examination of specimens and short talks for the evenings, will be followed. For further information write Miss Abbie F. Minott, *Secretary*, Phippsburg, Maine.

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CONTRIBUTION TO THE FLORA OF THE ISLANDS OF ST. PIERRE ET MIQUELON.

Bro. Louis Arsène.

PART I. GENERAL CONSIDERATIONS.

I. First Explorations.

Gautier and his work. The first work of any consequence written on the flora of the Islands of St. Pierre et Miquelon—the French Archipelago to the south of Newfoundland—is found in a thesis of Mr. Gautier, a chemist to the French Navy, published at Montpellier, France, in 1886,[1] and now so rare that it is next to impossible to find it. I owe to Mr. Flahaut, the eminent professor at the University at Montpellier, the advantage of having a copy of that thesis lying before me. He was good enough to have it typewritten from the bulky quarto volume in the library of the University, where the theses of the School of Pharmacy are bound, and he has carefully verified by himself the copy made. He will allow me to present him my grateful acknowledgements.

At the time the Gautier thesis was published, the knowledge of the plants of the region of Newfoundland was very incomplete: thus a good number of his determinations are erroneous; and, on the other hand, we do not know whether or not he left a collection of the plants which he had gathered. He does not name any locality, and, more than once, he simply states the genus without clearly designating the species. After a minute examination of his text, I am prepared

[1] Alphonse Gautier, Pharmacien de la Marine: Quelques mots sur l'Histoire naturelle et la météorologie des Iles St. Pierre et Miquelon (Terre-Neuve). Montpellier, 1886.

to say that he records 181 species, indigenous or introduced, of Phanerogams and vascular Cryptogams. He systematically leaves aside certain genera and whole families. For instance, he records but 3 *Cyperaceae*, without naming a single *Carex*.

Bonnet's Flora.—In 1887, Dr. Bonnet of the Muséum d'Histoire naturelle at Paris published in the "Journal de Botanique" his *Florule des Iles Saint-Pierre et Miquelon*[1] based on the specimens preserved in the Museum, and derived from three different sources:

a. The herbarium of De La Pylaie, made up after this botanist's explorations in the French Islands in 1816, 1819 and 1820, and comprising 215 species.

b. A small collection of 38 species, made in 1822, during a cruise, by Beautemps-Beaupré, a naval officer.

c. A collection of 145 species presented to the Museum in 1883 by Dr. Delamare of Miquelon.

Delamare's Flora.—The following year, in 1888, Dr. Delamare published in collaboration with Renauld and Cardot, his *Florule de l'Ile Miquelon.*[1] This work records 246 species of vascular plants, among which are included the 145 species spoken of above, and 101 others.

Delamare did not explore St. Pierre, and his investigations in the Island of Miquelon were brought to bear chiefly on the Cryptogams exclusive of Algae. So one must not wonder that he did not record a considerable number of plants which, if not common, at least are far from being rare, and some of which grow quite near the Village of Miquelon where he lived.

Results achieved by my predecessors. Of the 38 species recorded by Beautemps-Beaupré, 14 were not included in the series of 215 species found by De La Pylaie. Gautier added 63 species to the discoveries of his two predecessors, discoveries that, moreover, were most likely unknown to him; he confirmed 118 of their records, but 111 species seen by them escaped his notice altogether. As to Delamare, his lists contain 66 new species and 180 confirmed. After his researches, the ensemble of the vascular flora of the Islands comprised 358 species of which 112 had not been found by him. Among those 358 species, 283 might be considered as native, and 75 as introduced.

[1] "Journal de Botanique" de Morot, i. Paris, 1887.

[1] Florule de l'Ile Miquelon par E. Delamare, F. Renaud et J. Cardot. Lyon, 1888

II. My own Investigations.

A residence of several years at St. Pierre and frequent crossings to Grande Miquelon and to Langlade (which are respectively the northern and southern parts of the Island of Miquelon, united by a sand isthmus 7 miles long) have enabled me not only to trace out the greater part of the species mentioned by the botanists who have preceded me, but to discover 129 others—108 native and 21 introduced—which must in future take their place in the recorded flora of St. Pierre et Miquelon.

My botanical studies in that country were made from 1899 to 1903, and it was chiefly during the summers of 1900, 1901, and 1902 that my researches were pushed ahead. I have the advantage of having preserved the notes I made from day to day after each of my explorations, and I glean therein that out of 130 botanical excursions, 82 were in St. Pierre, 27 in Grande Miquelon and 21 in Langlade. That shows that I have chiefly studied the flora of St. Pierre. So, I have good reason to believe that very few species found by De La Pylaie and Gautier in this small Island have escaped my observation.

I ascertained in the whole Archipelago the presence of 454 species of vascular plants, and I gathered them all with the exception of 4 of the most common. Unfortunately, the specimens of 18 species were not preserved by me; either because they were lost after my departure from St. Pierre in July, 1903; or because they were destroyed after identification, as being insufficient for preservation in a herbarium and with the view of making another collection which my sudden and final departure did not allow me to realize.

During the year 1926, I sent to Professor Fernald specimens—a few of them only fragmentary—of 430 species[1] taken out of my herbarium of St. Pierre et Miquelon. This collection will remain in the Gray Herbarium of Harvard University. The specimens of two other species that I have been unable to supply to Mr. Fernald—*Habenaria Hookeri* and *Pyrola minor*—will be found in the New York Botanical Garden. Moreover, in 1906, I sent to that Institution a good number of native and introduced plants, chiefly those whose identification

[1] With regard to *species*, it must be understood once for all, that in the statistics of this little work of mine, the word is taken in rather a broad sense: it includes the varieties bearing a name and having often been considered as *species* properly so called by certain botanists. In the whole flora, there are 77 varieties, 1 form and 1 hybrid. In 56 cases, the species is represented only by a variety, the type being unknown in the Islands; 3 species are represented by 2 or 3 varieties without the type being present; only 13 species have the type and its variety.

could, in my opinion, present some difficulty. Dr. Britton and Dr. Small examined these plants, and the latter had the kindness to send me his remarks with the list of the corrections to be made upon my determinations. But the study of the plants of northeastern America has made such strides these last twenty years, the botanical nomenclature relating to this region has been so modified, that it appeared prudent for me to publish nothing about the flora of St. Pierre et Miquelon Islands without laying my work before the eminent specialist on the flora of Newfoundland and neighboring regions. My best thanks are due to Professor Fernald for having kindly verified my determinations, and for rectifying them in case of need. The report he sent on my herbarium, with documents on the critical species, enabled me to bring up to date the notes I present to the readers of Rhodora.

III. The Ensemble of the Flora.

The flora of St. Pierre et Miquelon as it is made out in the general list which I give at the end of the present paper, numbers 487 species, of which 391 are native and 96 introduced. I have included therein 33 species—of which 6 are introduced—brought to notice by my predecessors and which I have not found: 8 by De La Pylaie, 1 by Beautemps-Beaupré, 18 by Gautier and 6 by Delamare.

There would have been a much larger number if we were to include all the names given to the plants of the Islands by Gautier, Bonnet and Delamare, for not only Gautier, but even Bonnet and Delamare made obvious mistakes, and their identifications cannot reasonably be maintained in their entirety. In about 85 cases, after a very special study of each one, I had to transfer under other headings the names of the plants they referred to. Only a comparison between the plants gathered by them and those gathered by me would help settle any remaining doubts. It is more than likely that among the 18 species reported by Gautier and not met with again, several, because of some error in the naming, are contained in the lists of Bonnet and Delamare, or in mine. I have left them in the general list because there might be some possibility of their presence in St. Pierre et Miquelon; besides, has not experience warned botanists how imprudent it is to reject, with too great a facility, the affirmations of those who have preceded and opened up the way for them? Likely enough some of the names rejected by me ought to be maintained,

as they are, in the flora, or be brought under names different from those to which I connected them.

Of the 113 species recorded by his predecessors and not found by Delamare, 77 had been brought to notice by De La Pylaie, 5 by Beautemps-Beaupré and 31 by Gautier. Whilst I succeeded in rediscovering 69 of the non-confirmed plants of De La Pylaie and 4 of those of Beautemps-Beaupré, I was quite unable to find more than 13 of Gautier's. That is a much smaller proportion, and such a result seems to justify the remark made above regarding the plants of Gautier which have not been found again.

IV. Nature of the Soil and principal Stations.

Gautier and Delamare have treated of the physical geography and climatology of the Islands and it is not my intention to make any reference to them. I am not aware that the country was ever visited by a trained geologist and that any work of a serious nature has been published on its geological constitution and the history of its rock-formations. I personally deeply regret not to have profited by the opportunity I had, when living there, to study more carefully the nature of the soil and the intimate relations between it and the flora.

The Islands are formed of reddish porphyritic rocks with veins of quartz, as can be easily seen by examining the rugged cliffs of almost the entire coast-line, or the barren summits and slopes of the hills where the rock is denuded. Granite is found at Cap Blanc in Grande Miquelon and argillaceous schists in Langlade. Pure limestone and calcareous formations of any kind are entirely absent; nevertheless some calcicoles are found in Miquelon: *Equisetum scirpoides, Listera convallarioides, Laportea canadensis, Geranium Robertianum.*

I do not feel myself competent enough to give an opinion of any weight regarding the glaciation of the Archipelago. The erratic boulders which are seen, at certain places along the coast, between the lines of low and high water, have very likely been brought there by floating icebergs rather than by the work of glaciers. Gautier thinks the numerous isolated rocks, of various nature, which cover the southern plain of St. Pierre between the Town and Anse à Ravenel and Savoyard Point have the same origin and were carried there when that part of the Island was submerged. Does not the presence in Miquelon of *Alchemilla alpina,* which is only to be found

in America on one of the summits of the Colorado Mountains, supply us with an argument in favor of the non-glaciation of the Miquelon Archipelago? I am inclined to think it was spared or hardly touched by the glaciers which during the Pleistocene time invaded the centre of Newfoundland; if there was a glaciation it was only local.[1]

The principal stations where the native vegetation thrives are the following: (1) maritime sands, sandy beaches and shingle banks, firm and movable dunes; (2) rocky cliffs and landslips on the seashore, maritime hillsides; (3) salt marshes and meadows, brackish slime, and ponds communicating with the sea; (4) inland bogs and swamps, peaty moors and plains, marshy borders of ponds and brooks, fresh water ponds; (5) rugged summits and naked slopes of hills, gravelly and rocky barrens; (6) grassy slopes and semi-wooded bases of the hills, grassy plains neither sandy nor boggy; (7) wooded valleys.

The first is most interesting and of a wide range, for it includes the plain of Miquelon near the Village, and the Isthmus of Langlade whose total area is not much below that of the whole Island of St. Pierre. They constitute, so to say, the only alluvial soil of Miquelon. Their flora, especially that of the southern and northwestern dunes of the Isthmus, resembles much that of Sable Island.

The number of species essentially maritime, growing only in stations 1, 2 and 3, is not very high: hardly 40 species, that is 10% of the native flora.

In station 1, we find: *Agrostis alba*, var. *maritima*, *Ammophila breviligulata*, *Festuca rubra*, var. *oraria*, *Elymus arenarius*, var. *villosus*, *Juncus balticus*, var. *littoralis*, *Atriplex glabriuscula*, *Salsola Kali*, *Polygonum Raii*, *Spergularia salina*, *Sagina nodosa*, *Arenaria peploides*, var. *robusta*, *Cakile edentula*, *Potentilla Anserina*, *Lathyrus maritimus*, *Convolvulus sepium*, var. *pubescens*, *Mertensia maritima*. In station 2: *Cochlearia cyclocarpa*, *Sedum roseum*, *Ligusticum scothi-*

[1] [Bro. Arsène's belief that the French Islands were hardly touched by the Wisconsin glaciation finds strong support in the conclusions of Coleman regarding Newfoundland: "that there is evidence in Newfoundland of early Pleistocene glaciation by ice caps . . . The retreat of the early ice sheet, which was probably of Kansan or Jerseyan age, was followed by great emergence of the land . . . The effects of the early glaciation have been greatly obscured by later processes, and the ancient glaciated surface is in most places covered with débris and fragments of the underlying rock resulting from long-continued weathering . . . Probably hundreds of thousands of years elapsed . . . before the still fresh bowlder clay and striated surfaces were formed by the less extensive Wisconsin ice sheets . . . The Wisconsin ice probably covered less than half the island and was in the form of small separate sheets or valley glaciers."—Coleman, *The Pleistocene of Newfoundland*. Journ. Geol. xxxiv. 193–223 (1926).—M. L. F.]

cum, Coelopleurum lucidum, Plantago juncoides, var. *decipiens, Senecio Pseudo-Arnica.* In station 3: *Ruppia maritima,* var. *obliqua* (in brackish water), *Zostera marina,* var. *angustifolia* (in sea water), *Triglochin maritima, Scirpus americanus, Carex exilis, Carex maritima, Carex salina,* var. *kattegatensis, Iris setosa,* var. *canadensis, Rumex mexicanus, Chenopodium rubrum, Montia lamprosperma, Ranunculus Cymbalaria.*

It is impossible to draw a sharp line between the three stations, even for strictly halophilous plants: a number of the plants of station 1 are found in station 2 or 3 and vice versa. Halophytes very often live in close association with non-maritime species which have invaded their special habitats and are thoroughly established there. But the sea beach itself, especially when formed of pure sand or pebbles, is often bare of vegetation, with the exception of a few salt-loving plants such as *Arenaria peploides* and *Cakile edentula.*

If the flora of the Islands has a distinctive aspect of dreariness and monotony, it is, above all, due to the third and fourth stations. It may be safely asserted that the ponds, swamps, marshes and bogs cover more than half of their area, and 200 species at least, that is more than 50% of the native flora, are marshy aquatic or semi-aquatic plants.

The genus *Carex* seems to me the most striking of the paludal flora of the Islands. Nevertheless, it has been little studied by my predecessors since they have recorded but 11 species in all: I have been able to find 9 of these 11, and I have discovered 31 others. The 42 species of *Carex* of St. Pierre et Miquelon represent 1/9 of its flora, whereas this same genus represents but 1/22 of the flora of northeastern America, and hardly 1/40 of that of France.

Among the families that deserve very special attention, let me mention the *Orchidaceae* and the *Ericaceae.* It is a marvellous thing to see, in summer, extensive areas of the otherwise dreary bogs and barrens of the Islands literally covered with their colonies in full bloom.

There are 24 species of *Orchidaceae,* that is 6% of the flora; the proportion in northeastern America is 2% and in France 1.7%. The number of *Ericaceae* is about the same: 25 species, a little more than 6.6% of the flora, a high proportion when compared with the 2.4% of northeastern America and, above all, with the 0.7% of France.

The wooded valleys of Langlade form a station affording also much

interest. By their great extent they allow vegetation to expand and grow in a way quite unknown in Grande Miquelon and particularly in Saint Pierre. Among the 70 species that I have not been able to trace in the last Island, and which, in the present state of our knowledge, might be regarded as peculiar to Miquelon Island, there are more than 30 that belong exclusively to the valley of Belle Rivière, and to the neighbouring valleys of Anse aux Soldats and Anse à Ross. In my expeditions, only about a dozen of the species of Saint Pierre have not been met with either in Grande Miquelon or in Langlade. But it would be rash to affirm that they do not grow there. In fact I have explored the Island of Miquelon—whose area is 9 times that of Saint Pierre—but casually; and I feel sure I have not seen half of the interesting localities of Grande Miquelon, nor a quarter of those of Langlade, and it may be safely asserted that the greater part of the latter has never been visited by a botanist. So I am convinced that new investigations will allow of the adding of a good number more of species to the flora of the Archipelago. There must be more than 450 native species. That is a much greater number than the total put forward by Dr. Bonnet; he estimated that the 269 species—native and introduced—recorded in his "Florule" represented 8/10 of all the plants that grow in Saint Pierre et Miquelon. That was leaving the impression that the total of native species could hardly be greater than 260. It is more than likely he would never have drawn such a conclusion had he visited the French colony of Newfoundland.

One family especially does not seem to be sufficiently represented in the flora as it is known to us. Only 15 native species of *Compositae* have been observed in St. Pierre et Miquelon; that is about 1/26 of the phanerogamous flora. Such a number appears much inferior to what one would expect in a country where the stations are many and, in some degree, varied. For the East of Canada and the United States, the proportion is 1/8. That is also the ratio in France.

It would be well to look for the following species of *Compositae* which grow in southern Newfoundland: *Eupatorium maculatum; Solidago sempervirens, uliginosa, graminifolia; Aster puniceus* and *novi-belgii; Erigeron ramosus* and *annuus; Bidens frondosa; Prenanthes nana.*

V. Phytogeography.

(*a*). *Introduced Plants.*

To examine in a rational way the geographical affinities of the flora of St. Pierre et Miquelon, we must put aside the 96 introduced species. This number, which is 1/5 of the whole flora, may appear considerable. But the colony was inhabited even before Canada and the United States: we have proofs that it was visited by Breton and Basque fishermen as early as 1504, and that permanent settlements were made from 1600 onward. It is likely that some of the plants introduced are not yet naturalized; they are seldom found and always in a more or less isolated state. But the greater number among them seem to have adapted themselves to the climate and soil; many have spread so far into the interior of Grande Miquelon and Langlade that it is difficult to distinguish them from the indigenous plants.

Among those whose right to be called native is doubtful, I shall mention especially: *Primula veris,* which I came across in but one locality, near the Town of St. Pierre; *Myosotis arvensis* and *Erigeron canadensis,* indigenous on the American continent, but which I did not notice in the interior of Langlade or Grande Miquelon; *Anagallis tenella,* reported by both Gautier and Delamare, which I was unable to find despite a special search for it, and which, moreover, has not yet been observed in America; *Carex remota,* a Europeo-Asiatic plant reported by Delamare which, also, escaped my notice.

I have, notwithstanding, included these five species in the list of native plants. In regard to *Carex remota,* it seems impossible to treat it as an introduced species, if it were really ever found in Miquelon. It may be that Delamare mistook for it a plant common in bogs and which resembles it in general appearance, *Carex canescens,* var. *disjuncta.* But the fact that *C. remota* was reported from Newfoundland by Despreaux in the beginning of the last century pleads in favour of its maintenance in the indigenous flora of St. Pierre et Miquelon. There are no specimens of *Carex remota* from Delamare in the Museum of Paris: Dr. Bonnet mentions as coming from him only *Carex aperta* and *folliculata;* so, it seems impossible to settle the question with the documents now available.

(*b*) *Relations between the Flora of the French Islands and that of the Neighbouring Countries.*

I have not a sufficient knowledge of the flora of northeastern

America to treat in a competent way of the relations between the flora of St. Pierre et Miquelon and that of the adjacent regions: Newfoundland, Labrador, Nova Scotia and Sable Island, Prince Edward, Cape Breton and Magdalen Islands, Gaspé Peninsula, New England and its alpine areas, etc. I leave to Professor Fernald and his associates of the Gray Herbarium the task of studying this interesting matter, fortunate if I have been able to supply them with any new data.

I shall content myself with the following remarks.

Newfoundland.

In his *Notes upon the Flora of Newfoundland*,[1] Dr. Edwin H. Eames reports, as worthy of notice, 267 plants collected by him in July and August, 1908, in the regions of Bay of Islands and Bay St. George. Out of this number, 164 species—61%—are found in the French Islands, 200 miles distant, a striking proof that their flora is near that of the West of Newfoundland. Nevertheless, St. Pierre et Miquelon have only a few—15 perhaps—of the plants special to the Long Range, isolated species of the West of America, or endemics of western affinity whose number Professor Fernald estimates at 160 at least.

To be sure, the Miquelon flora is yet nearer that of the South of Newfoundland and very likely it does not differ in any way from that of the Burin Peninsula. Miquelon Island, geographically and geologically, is but an extension of the last, a few miles to the West. But was the Peninsula ever visited by botanists? My own explorations there were limited to a few walks in the vicinity of St. Lawrence on Placentia Bay, and Grand Bank on Fortune Bay.

It would doubtless be interesting to compare botanically the French Islands with the Avalon Peninsula, in the Southeast of Newfoundland. A certain number of European plants, unknown or very local on the American continent—except perhaps in Nova Scotia and the region bordering the Gulf of St. Lawrence—and growing in that part of Newfoundland, have not been found in St. Pierre et Miquelon, but it would be well to look for them there. I may mention: *Agrostis canina, Sieglingia decumbens, Nardus stricta, Glyceria fluitans, Festuca capillata, Carex leporina, Ranunculus hederaceus, Potentilla procumbens, Galium saxatile, Pedicularis sylvatica* and *palustris*, every

[1] Rhodora, xi. 85–99, May, 1909.

one of them native in the Island of Jersey. I do not speak of *Calluna vulgaris, Arbutus Unedo* and *Saxifraga Geum;* there is not the least chance of finding them in St. Pierre et Miquelon. The following European plants are native in the French colony as in the Avalon Peninsula: *Potamogeton polygonifolius* (also on Sable Island), *Deschampsia caespitosa* (the type, large panicled), *Juncus bulbosus* (Sable Island), *Juncus effusus*, var. *conglomeratus, Luzula campestris*, var. *congesta*,[1] *Polygonum Raii, Ranunculus Flammula, Pyrola rotundifolia*, var. *arenaria*. I am asking myself if *Veronica officinalis* of Miquelon is not identical with the special form, not yet sufficiently studied, which Professors Fernald and Wiegand collected in mossy swales and spruce woods of the Avalon Peninsula in 1911.[2]

The following plants, numbering ten, have not yet been reported from Newfoundland, but they are likely to be found at least in Burin Peninsula:[3] **Equisetum littorale*, **Juncus articulatus*, var. *obtusatus*, **Luzula saltuensis*, **Laportea canadensis, Thalictrum dioicum, Alchemilla alpina, Epilobium angustifolium* var. *macrophyllum*, **Bartonia virginica, Houstonia Faxonorum*,[4] **Convolvulus sepium*, var. *pubescens*.

To this list there is no longer any reason to add *Mitchella repens* as it was found for the first time in Newfoundland, near Port aux Basques, by Mr. Bayard Long in 1924.[5]

Southern Labrador.

The flora of St. Pierre et Miquelon is equally similar to that of southern Labrador. Out of the 195 native plants collected by Mr. R. H. Wetmore near Hamilton Inlet and Lake Melville in the summer of 1921,[6] 124 at least, that is 64%, are also native in the Islands, though the distance is not less than 600 miles.

Sable Island.

I have already had an opportunity to bring together, in a botanical point of view, Sable Island and Miquelon. 2/3 of the plants native in Sable Island as recorded by Dr. St. John[7] belong also to the flora

[1] Known only in S.W. Newfoundland: Rhodora, xxviii. 56 (1926).

[2] Rhodora, xxviii. 81 (1926).

[3] The plants marked * grow in Nova Scotia.

[4] *Houstonia Faxonorum* (Pease & Moore) Fernald, n. comb., to be published with these notes.

[5] Rhodora, xxviii. 56 (1926).

[6] Rhodora, xxv. 4–12 (1923).

[7] St. John: Sable Island; Proceedings of the Boston Society of Natural History; Vol. vi. No. 1. 1921.

of Miquelon. I shall specially mention the endemic *Lathyrus palustris* var. *retusus*. Perhaps *Centaurium umbellatum*, native in Sable Island, might be found in the sand plains and dunes of Miquelon, but I never saw it; it is abundant in the sandy barrens of Jersey under the characteristic form of var. *ellipticum* Druce. Some other Sable Island plants ought, in my opinion, to be searched for in Miquelon: *Agropyron repens*, var. *pilosum*, *Carex hormathodes*, *Carex silicea*, *Tillaea aquatica*, *Rosa virginiana*, *Œnothera cruciata*, *Centunculus minimus*, *Teucrium canadense*, *Euphrasia purpurea*, *Gnaphalium obtusifolium*. I think I found *Tillaea aquatica* in 1902 near the Grand Barachois, but it was late in the season, the flowers were gone and I did not take specimens, hoping to make a future collection.

Nova Scotia.

Out of the 480 native plants which in his work on the flora of Nova Scotia[1] Professor Fernald reports as remarkable in some way, about 110—only 23%— are known in St. Pierre et Miquelon. I feel that a comparison cannot be judiciously made if grounded on the very special plants enumerated in the above-mentioned work, and very likely representing less than one half of the flora of the silicious southwestern part of the Peninsula. However, the small proportion we get shows very clearly the greater disparity existing between St. Pierre et Miquelon and Nova Scotia on one side, as compared with Labrador or Newfoundland on the other.

One thing must be noted at the same time: that the similarity of the geological constitution and the climatic conditions in southwestern Nova Scotia and St. Pierre et Miquelon (as also in S. E. Newfoundland) give a somewhat similar general appearance to their vegetation, particularly that of their peaty bogs, savannahs, barrens, and of their numerous ponds. So a good number of the characteristic southern costal plain species—whose range sometimes extends as far as Florida and the Gulf of Mexico—growing abundantly in Nova Scotia are likewise found in St. Pierre et Miquelon. I may mention *Schizaea pusilla*, *Potamogeton bupleuroides*, *Calamagrostis Pickeringii*, var. *debilis*, *Eriophorium virginicum*, *Carex vulpinoidea*, *C. stipata*, *C. leptalea*, *C. intumescens*, *Juncus effusus*, var. *solutus*, *Iris versicolor*, *Habenaria clavellata*, *H. blephariglottis*, *Pogonia ophio-*

[1] Fernald: The Gray Herbarium Expedition to Nova Scotia, 1920; RHODORA, xxiii. (May, 1921 to April, 1922).

glossoides, Arcthusa bulbosa, Calopogon pulchellus, Myrica carolinensis, Rubus recurvicaulis, Rosa carolina, Gaylusaccia dumosa, var. *Bigeloviana, Chelone glabra, Solidago rugosa, Cirsium muticum.* I have given on p. 128 the Nova Scotia plants native in St. Pierre et Miquelon and *new* to Newfoundland.

The alpine areas of New England and the region bordering the Gulf of St. Lawrence.

In making use of the Tables prepared by Professor Fernald in his scholarly work, *Persistence of Plants in unglaciated Areas of Boreal America,*[1] we find that the flora of St. Pierre et Miquelon comprises:

a. 41 species out of the 93 arctic species reaching their southern limits in eastern America chiefly on alpine and subalpine areas of New England or northern New York (Table I), or 45%. It is a high proportion which, at first sight, enhances the distinctly alpine character of the flora. To these 41 species should be added *Alchemilla alpina* and *Houstonia Faxonorum,* the latter heretofore considered endemic on the alpine summits on the White Mountains.

b. 5 species out of the 78 arctic plants whose southern limits in America are the region bordering the Gulf of St. Lawrence (Table II). The proportion is only 6% and it is very likely too high, the presence of two of these species, reported only by Gautier, *Lycopodium alpinum* and *Artemisia borealis,* being very doubtful indeed.

c. 16 species out of the 65 boreal, but scarcely arctic, or European plants whose southern limits in America are also the region bordering the Gulf of St. Lawrence (Table III), or 25%.

d. 23 species out of the 297 western or endemic species centering on the Gulf of St. Lawrence—Gaspé, Long Range of Newfoundland, Labrador—and found in neither arctic nor subarctic America nor in Europe, that is about 8%. The plants of northwestern America growing in the French Islands are: *Lycopodium sabinaefolium,* var. *sitchense, Juniperus horizontalis, Calamagrostis canadensis,* var. *robusta, Carex Michauxiana* (Asia), *Listera convallarioides, Rumex mexicanus, Rubus acaulis, Epilobium angustifolium,* var. *macrophyllum, Epilobium glandulosum, Coelopleurum lucidum, Halenia deflexa, Anaphalis margaritacea,* var. *subalpina, Senecio Pseudo-Arnica* (Asia); that is 13 species out of 155.

[1] Memoirs of the American Academy of Arts and Sciences; Vol. xv, No. III, Boston, 1925.

And the endemics centering about the Gulf of St. Lawrence: *Abies balsamea*, var. *phanerolepis*, *Luzula campestris*, var. *acadiensis*, *Iris setosa*, var. *canadensis*, *Betula Michauxii*,[1] *Cochlearia cyclocarpa*, *Empetrum Eamesii*, *Gentiana nesophila* (?),[2] *Lonicera villosa*, *Lonicera villosa*, var. *calvescens* (Great Lakes), *Aster radula*, var. *strictus*; that is 10 species out of 142.

(*c*). *Relations between the Flora of the French Islands and that of the Boreal Hemisphere.*

The 391 native species may be summarily classified as follows: 1st. 210 species exclusively American, or 54%; 2nd. 42 species common to Europe and America, or 11%; 3rd. 19 species common to Asia and America, or 5%; 4th. 120 species common to Europe, Asia and America, or 30%.

1st. American Species.

The 210 American species are subdivided as follows:

a. 25 arctic or subarctic species coming, at low altitude, hardly south of the Gulf of St. Lawrence and reaching the alpine regions of New England; that is 12% of the total of American plants.[3]

b. 145 boreal species of the temperate regions, many of them going south almost to the 36th degree of latitude (States of Pennsylvania and Virginia) and not going farther north than the lower boundary of the subarctic zone; that is 69% of the total of American plants on the Islands.

If we exclude from this list the 20 species whose southern limit is the Gulf of St. Lawrence, we see that the majority of American plants which invaded the French Islands belong to the temperate regions of northeastern America, and have a southern, rather than a boreal, tendency.

c. 40 species reaching the warm temperate to subtropical zone, that is Georgia, Florida, Louisiana, Texas and Mexico, and not

[1] Reported by Bonnet (De La Pylaie) and Gautier.

[2] Reported by Gautier (doubtful).

[3] I have, in the present classification, treated as *arctic* the S. P. & M. plants contained not only in Tables I and II of the aforementioned work of Professor Fernald, but also those of Table III.

The plants of his Table IV have been placed in the lists of temperate regions, except the Asiatico-American *Rubus acaulis* and the American *Empetrum Eamesii* which have been considered as arctic. I thought it was better not to separate *Rubus acaulis* from *R. arcticus;* as for *Empetrum Eamesii* it has in Miquelon a strong tendency to dispute every inch of ground to arctic plants; it is found on the highest and quite denuded summits; it may yet be discovered in Arctic America.

going farther north than the 50th degree of latitude, or 19% of the American plants on the Islands.

When dealing with the flora of Nova Scotia, I named a good number of these southern or coastal plain species; here are some others: *Glyceria nervata, Bromus ciliatus* (var. *denudatus*), *Thalictrum polygamum, Cakile edentula, Cardamine pensylvanica, Sarracenia purpurea, Impatiens biflora, Œnothera muricata, Epigaea repens, Galium Claytoni.*

2nd. Species not exclusively American.

A like classification can be made for the plants common to Europe and America, to Asia and America, to Europe, Asia and America, taking into account their area of dispersion in North America.

a. Europeo-American plants. They are few in number, 42 species in all: 12 arctic, 26 of the temperate regions, and only 4 reaching the subtropical zone. Several are hardly European: the arctic *Habenaria dilatata* and *Habenaria obtusata* do not grow outside Iceland and the North of Norway; the American *Lobelia Dortmanna* is very rare and local in western Europe; the southern *Eriocaulon septangulare* is found in Europe only in the British Isles (Ireland and Scotland). Others are as sparingly American, as I have already said elsewhere.

b. Asiatico-American plants. Less numerous than the preceding—there are only 19—they present, however, some interest. 5 belong to the arctic zone, namely *Elymus arenarius*, var. *villosus, Ranunculus Cymbalaria, Rubus acaulis, Vaccinium Vitis-Idaea*, var. *minus* and *Artemisia borealis;* 9 to the temperate regions, among which are *Osmunda Claytoniana, Lycopodium obscurum, Mitella nuda, Rubus Idaeus*, var. *canadensis, Geum macrophyllum, Lathyrus palustris*, var. *pilosus;* 5 reach the subtropical zone, namely *Onoclea sensibilis, Osmunda cinnanomea* (also native in South America), *Polygonum sagittatum, Hypericum virginicum* and *Monotropa uniflora.*

c. Europeo-Asiatico-American plants. They constitute by far the most numerous of the three groups not strictly American, numbering 120 species, nearly 1/3 of the native flora.

As was to be supposed, the arctic section, formed of circumpolar plants, is very important: 46 species, which is 39% of the Europeo-Asiatico-American flora and 52% of the whole arctic (or alpine) flora of the Islands.

Here are some of the most remarkable plants of this section:

Equisetum variegatum, Lycopodium Selago, Lycopodium annotinum, var. *pungens, Hierochloe odorata, Hierochloe alpina, Scirpus hudsonianus, Carex scirpoidea, Carex rariflora, Sagina nodosa, Silene acaulis,* var. *exscapa, Montia lamprosperma, Sedum roseum, Rubus Chamaemorus, Rubus arcticus, Epilobium palustre, Cornus suecica, Arctostaphyllos alpina, Diapensia lapponica, Pinguicula vulgaris, Achillea borealis.*

The intermediate section—plants of the temperate regions—comprises 50 species which form 41% of the Europeo-Asiatico-American group, but only 21% of the ensemble of the species of the temperate regions. This fact shows well enough that the invasion of these plants was not so easy as that of the circumpolar plants. In this section we find: *Carex aquatilis, Carex Buxbaumii, Carex pallescens, Carex Oederi, Streptopus amplexifolius, Listera cordata, Corallorhiza trifida, Alnus incana, Veronica scutellata, Veronica serpyllifolia.*

As for the southern section, it does not comprise more than 24 species whose area of dispersion is, in general, very extensive. I may mention: *Potamogeton polygonifolius,* already cited, which grows not only in Europe and Asia, but in Greenland, in Africa and in Australia; *Zostera marina, Agropyron repens, Lemna minor, Juncus bufonius, Rumex acetosella, Trifolium repens, Callitriche palustris,* etc. I have also included in this section *Equisetum sylvaticum,* var. *pauciramosum,* very rare if not unknown in Europe, and which is the usual form of the species in North America.

3rd. Résumé of the Classification.

The following table is a *résumé* of the classification of the American and non-American native plants growing in St. Pierre et Miquelon; it combines the classification in latitude with the classification in longitude.

(*d*). *Conclusion.*

If the flora of St. Pierre et Miquelon is not so poor as Dr. Bonnet thought it to be after studying the specimens preserved in the Paris Museum, we may, however, concur with him in the general conclusion that "elle est caractérisée par l'absence d'espèces spéciales et par une identité parfaite avec la flore des contrées voisines."[1] All its native species and varieties are found either in Nova Scotia or Newfoundland

[1] Bonnet: Florule des I. St. Pierre & Miquelon: Journ. de Bot. 1, p. 264.

	American species	Per cent of the total: 210 species	Europeo-Amer. species	Per cent of the total: 42 species	Asiatico-Amer. species	Per cent of the total: 19 species	Europ.-Asiat.-Am. species	Per cent of the total: 120 species	Totals by categories	Per cent of the general total: 391 species
Arctic or alpine species .	**25**	12	**12**	29	**5**	26	**46**	39	**88**	22
Percent of the total: 88 spp.	**28**		**12**		**6**		**52**			
Spp. of temperate regions.	**145**	69	**26**	62	**9**	48	**50**	41	**230**	59
Per cent of the total: 230 spp.	**64**		**11**		**4**		**21**			
Spp. reaching subtropical regions.	**40**	19	**4**	9	**5**	26	**24**	20	**73**	19
Per cent of the total: 73 spp.	**54**		**6**		**7**		**33**			
Totals by categories. . . .	**210**		**42**		**19**		**120**		**391**	
Per cent of the general total.	**54**		**11**		**5**		**30**			

and the region bordering the Gulf of St. Lawrence with the possible exception, as far as we know, of two plants: *Alchemilla alpina* and *Houstonia Faxonorum*. The isolation of the Islands has not been sufficient to enable their vegetation to develop not only endemic species but even special varieties and forms.

(To be continued.)

THE IDENTITY OF CLADONIA BEAUMONTII.

C. A. Robbins.

(Plate 157.)

A difficulty confronts the reader who attempts to reconcile Tuckerman's descriptions[1] of *Cladonia Santensis* and its f. *Beaumontii* with those of Wainio.[2] No allowance for individual difference in the choice of defining terms will account for the lack of agreement between the two sets of descriptions, and a suspicion is bound to arise that the plants actually differ as greatly as the descriptions do;

[1] Tuckerman, Syn. Lich. 1: 245. 1882.

[2] Wainio, Act. Soc. Faun. Fl. Fenn. 4 (Mon. Clad. 1): 410: 1887 10 (Mon Clad. 2): 455. 1894.

in other words, that each set of descriptions is accurate but is based upon different plants.

Examination of the material preserved in Tuckerman's herbarium, together with the attached notes, shows that this is indeed the case; that the descriptions of Wainio do not apply to Tuckerman's types; and that instead of two distinct plants being involved there are three, at least. The following will make this clear.

Cladonia Santensis was based on material from the Santee canal, So. Carolina, collected by H. W. Ravenel. The type material in Tuckerman's herbarium bears the following note in Tuckerman's hand. "Decidedly, after renewed exam. C. Santensis Tuck. Suppl. α Nyl. Syn. is a Cladonia near to delicata and not a Pycnothelia. Its reaction is strongly K +. 'Leight. paper on Cladae'."

Cladonia Santensis f. *Beaumontii* was based on material from North Carolina, collected by Curtis and from Alabama, collected by J. F. Beaumont (see Tuck. l. c.). The specimens from Beaumont, which would naturally be considered the type since they are named for the collector and furthermore are the only plants in the group given that name in Tuckerman's herbarium, are annotated by Tuckerman as follows,—"C. fruticulosa erecta straminea epidermide in granulas secedente, dichotomo-ramosa, axillis apicibusq dilatatis dentates perviis, apoth.—." "K —."[1]

The comments together with the descriptions given by Tuckerman in the Synopsis afford a clearer view of the species and of the f. *Beaumontii*. Wainio's description of *Cl. Santensis* from Carolina, collected by Eckfeldt, "thallus et squamae tenuia, anguste laciniata, podetia KHO —, cortice dispersed areolato, apothecia aggregata" is not in agreement with the type plant of Tuckerman, but is, if by no other character, conclusively distinguishable from it by the minus chemical reaction. It is also obvious that Wainio's "*Cl. Beaumontii* (Tuck.) Wain." "secundum specimen orig. in Carolina sept. lectum

[1] A difficulty is met here. While the annotation clearly shows the plant to be other than Wainio's "*Cl. Beaumontii*" the description "axillis apicibusq dilatatis dentatis perviis" is not applicable to Beaumont's plants but it is applicable to the plants collected by Curtis from North Carolina. These, however, are not "dichotomo-ramosa"; as a matter of fact, they represent a rather slender, sterile state of *Cl. squamosa*, referable to the f. *multibrachiata* of Floerke. Tuckerman, in viewing both collections as specifically identical, made the herbarium description broad enough to cover both. In the Synopsis, however, in which occurs the first published description, the wording is quite different. No mention is made of the form as having dilated, open axils and apices and the description better fits Beaumont's plants. The omission is obviously intentional and offers further proof that Tuckerman considered these plants as constituting the type.

(ex herb. Tuck.) autonoma est species, affinis Cl. Gorgoninae, thallo primario diutius persistente, podetiis brevioribus (KHO intense lutescentibus).", differs completely in all essential characters from Tuckerman's f. *Beaumontii* and is as conclusively separable from it by its plus reaction to KOH alone.

A study of Tuckerman's herbarium material will show that he conceded to *C. Santensis* a wide latitude. After establishing the species there are referred to it a number of wholly unrelated plants. Thus, aside from the f. *Beaumontii*, which is certainly entitled to specific rank, and which is represented not only by the plants from Alabama, collected by Beaumont, but also by less slender and less elongated plants simply labeled "*C. Santensis*" (from Aiken, So Carolina, *H. W. R*[*avenel*]; from Texas, *Hall;* from Cuba, *Wright;*) there are referred here "*Cl. Santensis,* C. athelia Nyl. Light. Clad. Hook. Coll. p. 19 viditur, Bluefields Mountain, Jamaica, *Purdee*" (= *Cl. strepsilis* f. *glabrata* Wain. l. c. p. 409.) and "*Wright* Lich. Cuba No. 26, *C. Santensis status imperf.*" (= *Cl. macrophylliza* (Nyl.) Wain. l. c. p. 7.) Besides the *Cl. squamosa* form from North Carolina, *Curtis,* mentioned above, plants from Texas, coll. Wright with "apices pervii!"[4] represent a rather undeveloped state of the same species but shorter, stouter and with the apices more dilated. The lichen from Mission Dolores, California, *Bolander 30,* 1863 (cf. Tuck. l. c. p. 246) is a young state of *Cl. crispata.*

Moreover, plants from Beaufort, South Carolina, *Mellichamp,* and from Aiken, South Carolina, *Ravenel,* 1857, also labeled simply "C. *Santensis*" are essentially similar to material in the Farlow collection from Florida, coll. *Geo. V. Nash 1905,* 1895, determined by Dr. J. W. Eckfeldt as *Cl. Santensis f. Beaumontii.* Here is possibly the key to Wainio's quite natural misconception of Tuckerman's form. The plants from these three stations are KOH plus and agree with specimens from Wareham, Massachusetts, determined for the writer by Wainio, through the courtesy of Dr. Roland Thaxter, as "*Cl. Beaumontii* (Tuck.) Wain." With the exception of the collection from Beaufort, these plants are all in a sterile condition. The material in Sandstede, Clad. Exs. No. 1196, in the writer's set is mostly fertile and differs from Mellichamp's only in having the podetia squamulose.

[4] In the Synopsis analysis of *Cl. Santensis* Tuckerman refers plants from Texas, collected by Wright, to the species.

There are thus found to be represented in Tuckerman's conception of *Cl. Santensis* seven distinct species.[1] Four of these require no comment. The others, around which the confusion centers, are not difficult of separation and the following is an attempt to indicate the determining characters of each. Where practical the descriptions are based upon those of Tuckerman. (cf. Tuck, l. c.)

Cl. Santensis Tuck. Am. Journ. Sci. II. **25**: 427. 1858. Primary squamules glaucescent above, white beneath, small becoming somewhat elongate, the margins laciniate to dentate-crenate, KOH +; podetia glaucescent, obsoletely cup-forming, short, stout or slender, simple or short-branched; axils open; cortex dispersed and smoothly globose-areolate, the interspaces pellucid, KOH +; apothecia brownish.

The species is evidently southern. Aside from the station recorded for it by Tuckerman it has been collected in Florida by Rapp.[2] It is a much coarser plant than *delicata,* perhaps not far from *subsquamosa,* but has the pellucid under-surface of the first. The smooth, globose, dispersed areoles are characteristic.

Cl. Floridana Wainio in Sandst. Clad. Exs. No. 1196.[3] *Cl. Beaumontii* Wain. Act. Soc. Faun. Fl. Fenn. **10**: (Mon. Clad. 2) 455; 1894, as to description. *Cl. Daytoniana* Merrill, nom. nud. in Sandst. Clad. Exs. No. 1503. Primary squamules grayish-green to whitish-glaucescent above, white beneath, medium size to large, the margins subentire or dentate to sublobate, KOH +; podetia grayish-green to ashy or whitish-glaucescent,—60 mm. tall, esquamulose or squamulose but neither granulose nor sorediate; in sterile states slender, cylindrical, cupless, usually more or less branched particularly above, the branches

[1] Tuckerman's reference of so many widely differing plants to a single species may seem strange. But it is to be remembered that he was a pioneer in the investigation of American Cladonias and that the genus was then less understood than it is at the present time. Many species now well known were wholly unknown to him. The publication of Wainio's Monographia, which came later, not only, as Fink says "brought order out of chaos" but the analyses worked out in it put a truer valuation on specific characters. Characters now looked upon as having specific value Tuckerman viewed as of little importance. On the other hand, characters now taken to be really unimportant were considered by him as greatly important. Hence his conception of *Cl. squamosa* as a species always squamulose "the soon granulate epidermis disappearing at length in crowded ashy-green squamules" led to his inclusion in it of several squamose forms of other species. Hence also his conception of *Cl. Santensis* as a granulose plant, the "granules" affording 'a very characteristical note" explains his reference to it of remote plants, while the fact that the granules "finally disappear" opens the way for the admission of still other plants. It should be noted also that he often used the word "granulose" to indicate any disintegration of the cortex. His treatment of these two species shows this.

[2] *Cl. persquamulosa* Merrill, nom. nudum, in Sandst. Clad. Exs. No. 1207 and No. 1402, belongs here.

[3] The data includes "Podetiis haud distincte scyphifera, KHO denum leviter vel maculatim lutescentia, apicibus axillisve perviis Wain. in litt. 3. 4. 24." In the writer's set the reaction is strongly plus.

short, rigid, ascendant with pointed or subulate apices; axils slightly gaping, usually round-perforate, occasionally closed; in fertile states tending toward stouter and less branched forms with axils more dilated, often becoming obsoletely cup-forming; cortex continuous to areolately dispersed, smooth, subrugose or slightly cracked, the interspaces impellucid, KOH +; apothecia light- to dark-brown, rarely pallid or pale flesh-color, aggregated or subcorymbosely scattered.

Considerable difference exists between the sterile and fertile states. (See plate No. 157, figs. 2, 3, 5, 6) and Wainio's species is, in fact, based on the latter. Both states, however, are nothing more than normal variations in development and both are not uncommonly exhibited in the same plant. (figs. 1 and 4). The species is distinctive and offers no near comparison with any other. It occurs along the coastal plain from Florida north to Maryland and Massachusetts. Characteristic forms may be keyed as follows:—

Apothecia brown or brownish.
  Plants fertile.
    Podetia squamulose . . . . f. **typica** f. nov. (fig. 5)
    Podetia without squamules . . . . f. **esquamosa** f. nov. (fig. 6)
  Plants sterile.
    Podetia squamulose . . . . f. **elegans** Robbins comb. nov. (fig. 7)[1]
    Podetia without squamules . . . . f. **brachiata** f. nov. (figs. 2, 3)
Apothecia pallid or flesh-color . . . . f. **pallida** Robbins comb. nov.[2]

Plants from Aiken, S. C., Ravenel (*Cl. Santensis*) in Herb. Tuck. = f. *brachiata* (fig. 3); young state.

Plants from Beaufort, S. C., Mellichamp, (*Cl. Santensis*) in Herb. Tuck. = f. *esquamosa* (fig. 6); pr. p. atyp.

Plants from Florida, Nash, (*Cl. Santensis* f. *Beaumontii*) in Herb. Farlow = f. *brachiata*. Some of the material is undeveloped, similar to Ravenel's plants from Aiken, S. C. The larger part is normally developed and well pictured in fig. 3.

Sandst. Clad. Exs. No. 1503, plants from Florida, Rapp, (*Cl. Daytoniana* Merrill) includes (in the writer's set) thallus and young plants of f. *brachiata*, somewhat similar to fig. 1; and a group of rather undeveloped but typical plants of f. *esquamosa;* (fig. 6) intermixed with a few young plants of *Cl. squamosa.*

Sandst. Clad. Exs. No. 1196, plants from Florida, Rapp, (*Cl. Floridana* Wain.) includes (in the writer's set) a group with thallus and young plants of f. *brachiata* somewhat similar to fig. 1; and a group of well developed examples of f. *esquamosa* together with typical plants of f. *typica;* both of which agree well with figs. 6 and 5.

Cl. Beaumontii (Tuck.) Wainio, Act. Soc. Faun. Fl. Fenn. 4. **4:** 411; 1887. (Mon. Clad. 1.), as to name only. Syn. *Cl. Santensis* f.

[1] *Cl. Beaumontii* f. *elegans* Robbins, Rhodora 27: 51.
[2] *Cl. Beaumontii* f. *pallida* Robbins, Rhodora, l. c.

Beaumontii Tuck. Syn. Lich. **1**: 245. 1882.[1] Primary squamules small to medium size, glaucescent above, white beneath, the margins laciniate to denticulate, KOH —; podetia glaucescent, esquamulose or scatteringly squamulose, cylindrical, becoming slenderly elongate, branched, the branches dichotomously divided; apices imperforate or occasionally minutely perforate, obtuse, cristate-denticulate; axils closed; cortex dispersed, soon minutely scattered, KOH —; apothecia brown.

The species is not truly granulose. (Cf. Tuck. l. c.; also see note 5). It is somewhat remote from the two preceeding and under Wainio's arrangement of the genus would properly come under the section *Clausae* Wain.; possibly not far from *pityrea*. So far as known its distribution is wholly southern.

The writer is indebted to Dr. S. F. Blake for helpful criticisms and suggestions in the preparation of this paper and to Dr. C. W. Dodge for similar aid and also for assistance in the herbarium.

Onset, Massachusetts.

Explanation of Plate 157.

Cladonia floridana Wain. Variations in development. Plants from Wareham, Massachusetts. Herb. *C. A. Robbins*, No. 540, a, b, c, d, e, f, g. Fig. 1. Thallus with fertile and sterile plants; Fig. 2. Sterile plants from among grass in open pine woods (f. *brachiata*), a robust state; Fig. 3, Similar to No. 2 but more slender, the common form; Fig. 4, Plants with both fertile and sterile proliferations; Fig. 5, Fertile, squamulose plants (f. *typica*), robust specimens; Fig. 6, Fertile, esquamulose plants (f. *esquamosa*); Fig. 7, Sterile, squamulose plants (f. *elegans*).

SPARTINA PATENS AND OTHER SALINE PLANTS IN THE GENESEE VALLEY OF WESTERN NEW YORK.

W. C. Muenscher.

Spartina patens (Ait.) Muhl. was found on low swampy ground bordering Wolf Creek below the salt factory at Silver Springs, Wyoming County, New York. This grass, which, with *Juncus Gerardii* Loisel., forms a large part of the "wild hay" of the salt marshes of the Atlantic Coast, apparently has not previously been reported this far inland. The only New York State records that could be found for *Spartina patens* are those from Long Island and the vicinity of New York City.

[1] *Cl. stenophylliza* Wain., nom. nudum, (*Cl. stenophyllia* Merrill) in Sandst. Clad. Exs. No. 1184; from Sanford, Florida, leg. Rapp, is, as it is represented by the writer's set, a young state of this species.

The salt factory at Silver Springs is said to have been established about fifty years ago. The waste salt and brine has been, and still is being, dumped into Wolf Creek, with the result that its water is very salty from Silver Springs to where it enters the Genesee River, a distance of about three miles.

In this artificial saline habitat a number of salt plants have appeared. *Spartina patens* occurred in a pure stand over an area about thirty meters in diameter. Around the border of this area it was mixed with *Juncus Gerardii*. *Salicornia europaea* L., *Juncus Gerardii* and *Chenopodium glaucum* L. were common in a number of places along the shore of the stream. *Ruppia maritima* L. was very abundant in the stream, in some places completely covering the bottom of the stream for a distance of several hundred meters. *Enteromorpha intestinalis* (L.) Grev., a common green alga of the seashores, made a very profuse growth on the stones and other objects in Wolf Creek. In several places near the village of Castile where the water was flowing rapidly, its fronds attained a length of about one meter.

The observations here reported were made on August 30 and October 23, 1926. Specimens of the phanerogams mentioned, with determinations verified by Professor K. M. Wiegand, are deposited in the herbarium of Cornell University.

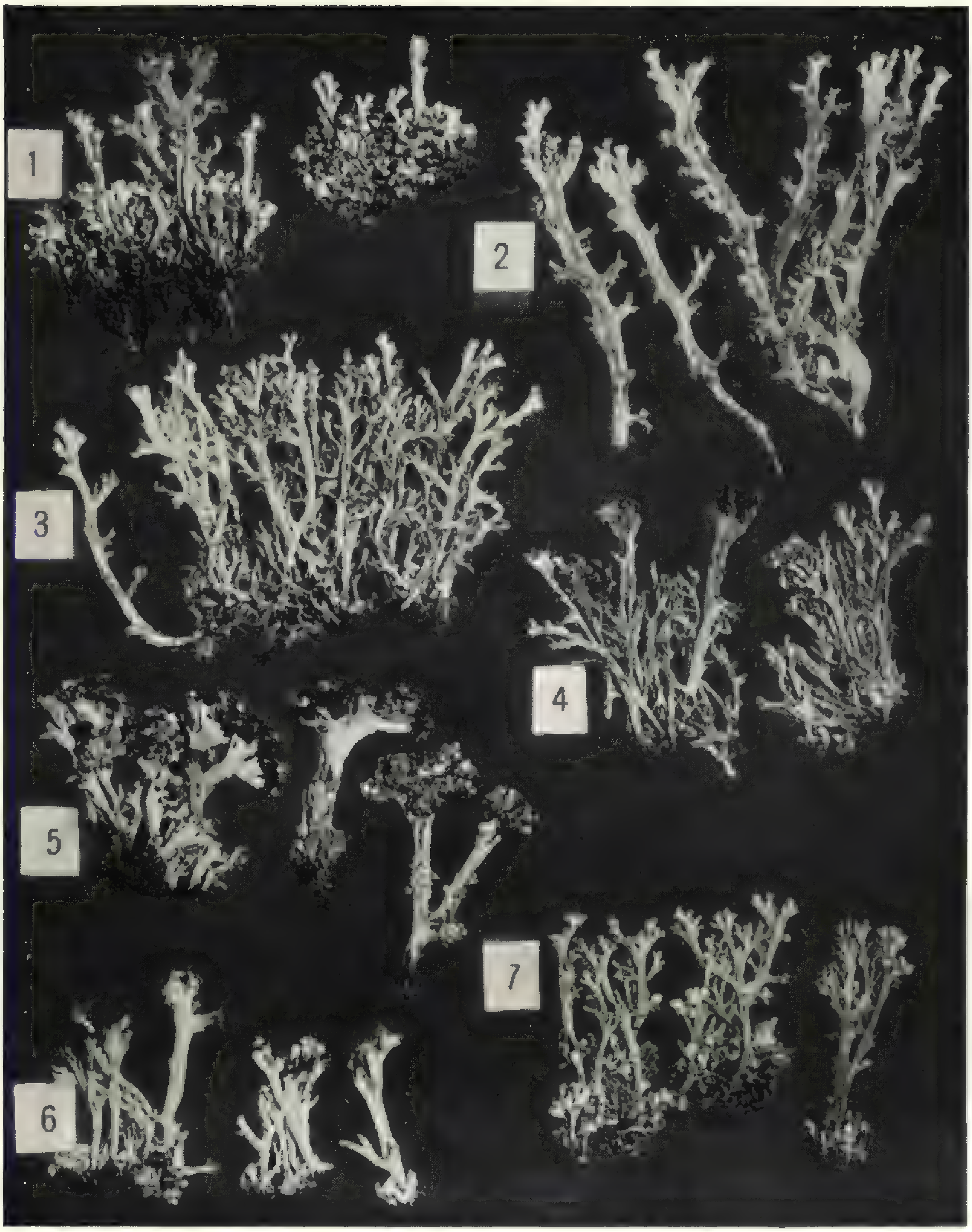
Cornell University.

Soil Reaction of Saxifraga Aizoon on Mt. Katahdin.—In the note by Mr. Stebbins on plants new to Mt. Katahdin in the January number of Rhodora[1] he calls attention to the possibility that there may be a pocket of rich soil at the point where the *Saxifraga* and *Draba* are growing. I am glad to report that his view is correct. At the time when the first of these plants was originally discovered, Dr. I. M. Johnston turned over to me some of the soil attached to the roots, as received at the Gray Herbarium, and on testing it with the double-wedge comparator I found it to be exactly neutral. The lime producing this condition in the soil may have come from a local concentration of calcium minerals in the granite—which is well known to occur elsewhere in Maine, especially on Mt. Desert Island—or may have been set free by unusually thorough decomposition of the humus at this point. The thing most difficult to account for

[1] Rhodora xxix. 15–16 (1927).

would seem to be the manner in which the seeds of these circumneutral soil species managed to "find" this favorable spot in the middle of a vast area of soils too acid to permit the plants to thrive. — Edgar T. Wherry, Washington, D. C.

Vol. 29, no. 342, including pages 97 to 116, was issued 22 June, 1927.



CLADONIA FLORIDANA

SEP 1 1927
A
Farlow Bot. Lab.

Rhodora

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THREE NEW PLANTS FROM THE LOWER ST. LAWRENCE.

M. L. Fernald.

The high degree of endemism in the floras about the Gulf of St. Lawrence has been much emphasized and it has been repeatedly pointed out that the regions of Gaspé, Anticosti, the Mingan Islands and western Newfoundland, largely escaping denudation by the last or Wisconsin glaciation, are so little explored that they will yield many more novelties. During the summers of 1924, 1925, and 1926, Brothers Victorin and Rolland have further demonstrated the great interest of the flora of Anticosti and the Mingan Islands by bringing back our first eastern collections of such plants as *Scirpus alpinus* Schleich., *Cypripedium passerinum* Richardson and *Listera borealis* Morong; by discovering new localities for other species rare in eastern America, such as *Hedysarum Mackenzii* Richardson and *Hieracium groenlandicum* Arvet-Touvet; and by securing novelties, such as the remarkable *Cirsium minganense* Victorin and other endemics already described by Bro. Victorin. To the long list of notable plants of these islands should be added the three following, two of them already known, but now for the first time made clear through the ample new collections of Victorin and Rolland.

Erysimum **coarctatum**, n. sp., bienne vel perenne *E. asperum* simulans; caulibus solitariis vel caespitosis simplicibus vel ramosis 0.4–7.5 dm. altis cinereo-strigosis; foliis radicalibus anguste oblanceolatis integris vel obsolete dentatis 2–7 cm. longis 3–8 mm. latis utrinque strigosis apice subacutis vel obtusis, foliis caulinis approximatis valde adscendentibus lineari-lanceolatis vel -oblanceolatis acutis vel obtusis mediis 2–4.5 cm. longis; racemis confertis deinde elongatis rigidisque; pedicellis coarctatis crassis deinde 5–9 mm. longis; calycibus

6–8 mm. longis, sepalis lineari-oblongis obtusis stramineis; petalis aureis limbo spathulato-oblongo vel anguste obovato 4.5–6 mm. longo 2–3 mm. lato; ovario cinereo; capsulis coarctatis cinereis 3–6 cm. longis 2 mm. latis; seminibus quadrato-oblongis 1.6–2 mm. longis.—Eastern Quebec and western Newfoundland: Quebec: Mingan Islands, July 4, 1861, *Hyatt, Verrill & Shaler*, July, 1882, *Chas. Linden;* sur les graviers calcaires, Ile du Fantome, Archipel de Mingan, 28 juillet, 1924, *Victorin & Rolland*, no. 18,240; sur les calcaires au pied des falaises, Ile Quin, Mingan, 28 juillet, 1924, *Victorin & Rolland*, no. 18,241; sur les rivages calcaires, Ile Niapisca, Mingan, 30 juillet, 1924, *Victorin & Rolland*, no. 18,242; sur les cailloutis calcaires, Ile à la Proie, Mingan, 20 juillet, 1925, *Victorin & Rolland*, no. 21,464 (type in Gray Herb.); rivages caillouteux et nus, Ile Nue, 29 juillet, 1926, *Victorin & Rolland*, no. 24,856; calcaires nus du côté du large, Ile Quin, 24 juillet, 1926, *Victorin & Rolland*, no. 24,857; Anticosti, 1861, *Hyatt, Verrill & Shaler;* 25 miles inland, Anticosti, August 22, 1917, *Victorin*, no. 4361. Newfoundland: high beaches, Chimney Cove, July 17, 1896, *Waghorne*.

Erysimum coarctatum is the extreme eastern representative of *E. asperum* DC. Farther west several species are ordinarily confused under the latter name. They all, however, have much larger flowers and longer pods; the plant which seems to be true *E. asperum* having the calyx about 1 cm. long, the limb of the broadly obovate petal about 1 cm. long and 5–7 mm. broad, the capsules divergent and when mature about 1 dm. long and 1 mm. thick, the seeds 1–1.4 mm. long, and the leaves strongly repand. This typical *E. asperum* extends eastward occasionally along railroads and is represented from western Quebec (Hull, 1921, *Victorin*, no. 15,620).

Solidago **anticostensis**, n. sp., plus minusve glutinosa; caulibus subcaespitosis vel solitariis decumbentibus vel erectis 0.8–2.5 dm. altis glabris vel sparse minuteque setulosis; foliis submembranaceis utrinque glabris vel minute ciliolatis, basilariis rosulatis ellipticoovatis vel spathulato-obovatis apice acutis vel rotundatis grosse serratis vel crenatis basi late petiolatis 3–7 cm. longis 1.5–3 cm. latis, foliis caulinis subdistantibus 8–15 infra inflorescentiam anguste obovatis vel oblanceolatis crenatis vel integris obtusis vel subacutis, imis subpetiolatis, mediis superioribusque sessilibus 1.5–5.5 cm. longis 0.4–1.5 cm. latis; inflorescentia thyrsoidea densa 2–6 cm. longa 2–2.5 cm. diametro; pedicellis 2–5 mm. longis sparse setulosis; involucro late campanulato 5.5–8 mm. alto; bracteis 5-seriatis subcoriaceis glutinosis, exterioribus lanceolatis, interioribus oblongis obtusis 1–1.7 mm. latis; disci floribus circa 20, lobis 1.3–1.8 mm. longis; ligulis 10, 3–4 mm. longis; antheris 2 mm. longis; achaeniis 2 mm. longis strigosis.—Quebec: on rocks close to the sea. South-

West Point, Anticosti Island, July 15, 1883, *J. Macoun*, no. 23; falaises caillouteuses sèches, Pointe Sud-ouest, Anticosti, Août 7, 1926, *Victorin & Rolland*, no. 25,158 (TYPE in Gray Herb.); falaises argilo-calcaires sèches, Rivière la Loutre, Anticosti, Août 7, 1926, *Victorin & Rolland*, no. 25,156.

A beautiful plant of the § *Virgaurea*, thoroughly consistent in all three collections and standing about midway between *Solidago Cutleri* Fern. and *S. Randii* (Porter) Britton. It has the large involucres, broad bracts, and long corolla-lobes of *S. Cutleri*, but the comparatively few flowers, short anthers and short achenes of *S. Randii*. In *S. Cutleri*, unknown nearer than Mt. Katahdin, Maine, the cauline leaves are usually only 2–7 below the inflorescence (in *S. anticostensis* 8–15); in *S. Cutleri* the heads are about 50-flowered, the anthers 2–3 mm. long and the achenes 3–3.5 mm. long (in *S. anticostensis* the heads 30-flowered, the anthers at most 2 mm. long and the achenes only 2 mm. long). In *S. Randii*, which reaches its northeastern limit in Maine, the cauline leaves are lanceolate rather than oblanceolate; the involucres only 5–6 mm. high, with about 3 series of narrow and acutish bracts; and the lobes of the disk-corollas are rarely more than 1 mm. long.

The Macoun material of *S. anticostensis* was distributed as *S. humilis* Pursh, but the identification afterward changed by Gray to *S. Virgaurea*, var. *alpina* Bigel. Under the former name the Anticosti plant was cited in Macoun's *Catalogue;* under the latter name in the *Synoptical Flora*.

SOLIDAGO **Victorinii**, n. sp., plus minusve glutinosa; caulibus subcaespitosis decumbentibus 1.7–2.5 dm. altis glabris; foliis subcoriaceis utrinque glabris, basilariis rosulatis oblanceolatis apice subacutis crenato-serratis basi petiolatis 4 cm. longis 1 cm. latis, caulinis 9–11 infra inflorescentiam, imis mediisque oblanceolatis acutis 2–4 cm. longis 0.5–0.8 cm. latis adpresso-serratis, superioribus valde reductis lanceolatis integris acutis; inflorescentia thyrsoidea subdensa 7–8 cm. longa 2–2.5 cm. diametro; pedicellis 2–5 mm. longis sparse setulosis; involucro cylindrico-campanulato 5.5–6 mm. alto; bracteis circa 3-seriatis coriaceis dorso pruinosis, exterioribus lineari-oblongis obtusis, interioribus spathulatis ciliatis apice rotundatis 1 mm. latis; disci floribus circa 10 lobis 1 mm. longis; ligulis 7, 2–3 mm. longis; antheris 2 mm. longis; achaeniis immaturis 1.2 mm. longis valde hirsutis.—QUEBEC: corniches calcaires, Rivière Chicotte, Anticosti, Août 15, 1926, *Victorin & Rolland*, no. 25,069 (TYPE in Gray Herb.).

S. Victorinii was growing with *S. racemosa* Greene, from which it

is at once distinguished by the spathulate round-tipped bracts, short pedicels, and copiously hirsute rather than appressed-setulose achenes. Its involucre as promptly separates it from other near allies, such as *S. Randii* (Porter) Britton and *S. chlorolepis* Fernald; the latter also quickly distinguished by its truncate to round-tipped leaves, elongate pedicels (1–1.5 cm. long) and small involucres (3–4 mm. high). *S. Victorinii* is simulated by some specimens of *S. hispida*, var. *tonsa* Fern., but the latter plant has the stems villous, at least at base, the leaves commonly with axillary fascicles, the involucres mostly smaller and with the bracts narrowed at summit, and the achenes glabrous.

Gray Herbarium.

CONTRIBUTION TO THE FLORA OF THE ISLANDS OF ST. PIERRE ET MIQUELON.

Bro. Louis Arsène.

(*Continued from p. 133*)

PART II. ENUMERATION OF PLANTS DESERVING SPECIAL MENTION, WITH NOTES.

The following enumeration comprises: 1st. 129 plants new to the flora of St. Pierre et Miquelon, not having been reported by Gautier, Bonnet and Delamare; 2nd. 13 plants reported only by Gautier and rediscovered by me; 3rd. about 85 plants, misnamed, in my opinion, by Gautier, Bonnet or Delamare, or belonging to groups which have been revised since their publications. In doubtful cases, a note states the reasons why I decided to change the name.

For each of these plants, I give, with the date, the locality where I collected it, and, especially for the plants new to the Islands, I add indications about their habitat and frequency.

Unless otherwise stated, specimens of the plants enumerated here are deposited at the Gray Herbarium where they may be seen and their determination verified.

Some remarks with reference to identification, range etc., have been added on certain other plants, and I have included here and there several notes Professor Fernald had the kindness to send in a letter dated December 9, 1926, when reporting on my herbarium.

The names of the plants *new* to St. Pierre et Miquelon are marked

with an asterisk (*). The abbreviation C. stands for *common;* CC., for *very common;* R., for *rare;* and RR., for *very rare.*

POLYPODIUM VIRGINIANUM L.—Mossy and rocky hillsides and banks, shaded rocks, sometimes tree trunks; C. in Miquelon; R. in St. Pierre. Belle Rivière Valley, Langlade, July 18, 1901.

Named *P. vulgare* L. by Bonnet and Delamare.

PTERIDIUM LATIUSCULUM (Desv.) Maxon.—Open places, woody hillsides; CC. Cap Noir, St. Pierre, July 10, 1901.

Named *Pteris aquilina* L. by Gautier, Bonnet and Delamare.

*ATHYRIUM ANGUSTUM (Willd.) Presl., var. RUBELLUM (Gilbert) Butters.—Moist woods, shaded ravines; C. in Langlade; R. in Grande Miquelon; not found in St. Pierre. Belle Rivière Valley, July 18, 1901.

THELYPTERIS SPINULOSA (O. F. Muell.) Nieuwl., var. AMERICANA (Fisch.) Weatherby.—Woods and thickets, in damp soil; C. Bois de Mirande, Miquelon, July 23, 1901.

Named *Polystichum spinulosum* DC. by Bonnet and Delamare.

Thelypteris hexagonoptera (Michx.) Weatherby is reported by Delamare. I did not see it. Professor Fernald writes: "This plant is not known east of southern Maine." It is possible that there is an error of determination and that, for instance, vigorous specimens of the related species *Thelypteris Phegopteris* (L.) Slosson have been mistaken for *T. hexagonoptera*. *T. Phegopteris* is not rare in Miquelon.

*ONOCLEA SENSIBILIS L.—Moist woods, grassy brooksides; C. in the wooded parts of Langlade; R. in Grande Miquelon. Belle Rivière Valley, July 18, 1901.

EQUISETUM SYLVATICUM L., var. PAUCIRAMOSUM Milde. See RHODORA, XX. 131 (1918).—Moist woods, damp shady places (sandy or muddy); CC. Anse à Ravenel, Saint Pierre, June 20, 1901; Belle Rivière, Langlade, July 18, 1901.

Bonnet and Delamare record the type instead of the American (and Asiatic) variety.

*EQUISETUM LITTORALE Kühlewein.—Wet or inundated sandy places; marshy banks of streams; in Miquelon only, where it is not very common; not found in St. Pierre. Marshes in Belle Rivière Valley, July 18, 1901.

Professor Fernald writes: "*Equisetum littorale* is an interesting extension eastward from central Nova Scotia."

*EQUISETUM SCIRPOIDES Michx.—Moist, sandy or rocky woods especially in the shade of evergreens; R.; not found in St. P. Wooded banks of Belle Rivière, June 21, 1902.

*Lycopodium lucidulum Michx.—Moist woods; R.; not found in St. P. Belle Rivière Valley, near Les Fourches, June 1, 1903.

*Lycopodium annotinum L., var. pungens Desv.—Exposed places, summits of hills; C., but less frequent than the type. Summit of La Vigie, St. Pierre, June 18, 1903.

*Lycopodium sabinaefolium Willd., var. sitchense (Rupr.) Fernald.—Hillsides, dry coniferous woods; C. Anse à Henry, St. Pierre, May 26, 1903.

Lycopodium clavatum L., var. brevispicatum Peck.—Rocky hills and plains, dry woods; C. in Miquelon; R. in St. Pierre. Ruisseau du Renard, Miquelon, July 24, 1901.

Delamare and Bonnet report the type.

Lycopodium complanatum L., var. flabelliforme Fernald.—Dry woods particularly of evergreens; R. Belle Rivière Valley, August 16, 1902.

Delamare and Bonnet report *L. complanatum* L. Very likely they give that name to the variety *flabelliforme;* but the type, which I never met, may possibly grow in the Islands.

I did not find *Lycopodium inundatum* L., var. *Bigelovii* Tuckerm. This variety, which is rather common in Cape Breton, Nova Scotia and S. E. Newfoundland, is to be looked for in St. Pierre et Miquelon. The type is frequent: Etange du Trépied, St. Pierre, May 27, 1901.

In regard to *Lycopodium alpinum* L., reported by Gautier, Professor Fernald writes: "I suspect that he had *L. sabinaefolium*, var. *sitchense* which was mistaken several times by early Newfoundland collectors for *L. alpinum*. *L. sabinaefolium*, var. *sitchense* is common in southern Newfoundland, but we have never had any trace of *L. alpinum* south of northern Labrador, except on the mountains of the Gaspé Peninsula."

*Pinus Strobus L.—Woods; R; found neither in Grande Miquelon nor in St. Pierre. Belle Rivière Valley, July 19, 1902.

*Picea rubra (Du Roi) Dietr.—Belle Rivière Valley, August 24, 1900.

I did not find this tree anywhere except in the woods of Langlade where it is mixed with *Picea mariana* and *P. canadensis*. These last two species grow in Grande Miquelon and St. Pierre, and seem much more common, but there they are not taller than mere shrubs. In the wooded valleys of Langlade *P. mariana, canadensis* and *rubra* grow as high as 10 metres, but even there that size is exceptional.

Abies balsamea (L.) Mill., var. phanerolepis Fernald, Rhodora, xi. 203 (1909).—Anse à Ravenel, St. Pierre, June 3, 1900. Dwarf

tree which, very often, particularly in St. Pierre, does not reach 1 metre, and forms dense thickets.

The type is reported by Gautier and Delamare. In Nova Scotia both the variety and the type are native; it may be the same in St. Pierre et Miquelon. Bonnet is not aware of the existence of this tree which, very likely, is the most common in the country.

Juniperus communis L., var. montana Ait.—Rocky, gravelly and sandy places; plains and hills; C. Anse à Ravenel, St. Pierre, June 6, 1901.

Named *J. communis* L. by Gautier, Bonnet and Delamare.

Juniperus horizontalis Moench.—In the same stations as the preceding, but less common. La Vigie, St. Pierre, June 7, 1900.

Named *J. virginiana* L. by Bonnet and Delamare, and *J. sabina* L. by Gautier.

Note on Tsuga canadensis (L.) Carr.—Delamare says this tree is very common in Miquelon. I never met with it. Indeed Delamare's affirmation cannot be easily accounted for, and there must have been some confusion. Bonnet's "Florule" does not mention the tree which, as far as I know, is not found in Newfoundland. On the eastern American continent, it does not go beyond, if it reaches it, the 48th degree of latitude. Delamare did not supply the Paris Museum with any specimens of *Tsuga canadensis:* the only *Coniferae* Bonnet indicates as coming from that botanist are *Juniperus communis* and *virginiana.* As *Tsuga canadensis* grows in Nova Scotia, it may have reached Miquelon, but in that case it must be very rare. I did not keep it in the general list.

Sparganium angustifolium Michx.—Shallow water in ponds, sometimes in brooks; C. Etang du Fauteuil, Saint Pierre, August 25, 1899.

Very likely the plant named *S. natans* L. by Gautier, Bonnet and Delamare.

Potamogeton polygonifolius Pourret.—Pools and shallow ponds; quiet streams; CC. Savoyard, St. Pierre, September 2, 1900.

Named *P. natans* L. by Gautier, Bonnet and Delamare.

*Potamogeton epihydrus Raf.—Ponds and slow brooks; C. in Miquelon; R. in St. Pierre. Ruisseau de la Carcasse, Miquelon, July 23, 1901.

Gautier reports *P. plantagineus* Du Croz (*P. coloratus* Hornem.), which is not known in America. Perhaps he gives that name to the preceding species or to *P. heterophyllus* Schreb., which is not rare in still or running water in St. Pierre as well as in Miquelon.

Potamogeton bupleuroides Fernald.—Still, sometimes flowing water; often in brackish ponds. Plain near the hill called Chapeau de Miquelon, July 23, 1901.

Named *P. perfoliatus* L. by Delamare.

Ruppia maritima L., var. obliqua Aschers. and Graebn.—In brackish water; not common. Grand Etang de Miquelon (communicating with the sea), July 23, 1901.

Named *R. rostellata* Koch by Bonnet.

*Zostera marina L., var. angustifolia Hornem.—Sandy bays, above and immediately below low-water mark; not common in Miquelon; not found in St. Pierre. Isthmus of Langlade, August 24, 1900.

*Echinochloa crus-galli (L.) Beauv.—Introduced in cultivated ground; not C. Garden in St. Pierre, September 2, 1900.

*Setaria lutescens (Wigel) Hubbard.—As the preceding; R. Garden in St. Pierre, September 10, 1900.

*Hierochloe odorata (L.) Wahl.—Damp places; low plains and brooksides; R; not found in St. Pierre. Belle Rivière Valley, Langlade, August 16, 1902.

*Hierochloe alpina (Sw.) R. & S.—Hillsides and high exposed places; R; not met with in Miquelon, but likely to grow there on the summits of the hills. Hill above Anse à Pierre, St. Pierre, June 28, 1903.

Alopecurus geniculatus L.—Low and inundated grounds; banks of rivers and brooks; C. Anse à Ravenel, St. Pierre, June 6, 1901.

Reported by Gautier, but not by Bonnet and Delamare. Seems to be native.

*Agrostis alba L., var. maritima (Lam.) G. F. W. Meyer.—Rocky or sandy places near the sea; salt meadows; C. Banks of the Etang de Savoyard, St. Pierre, August 26, 1901. Native plant.

*Calamagrostis Pickeringii Gray, var. debilis (Kearney) Fern. & Wieg., Rhodora, xv. 135 (1913).—Marshes and brooksides, damp woods; C.; R. in St. Pierre. Chapeau de Miquelon, July 31, 1901.

*Calamagrostis canadensis Beauv., var. robusta Vasey.—In the same station as the preceding, with which it very often grows; C. Banks of the Ruisseau de Mirande, Miquelon, July 31, 1901.

Ammophila breviligulata Fernald.—Sandy beaches; C. Covers extensive areas on the dunes of Miquelon; a sand-binder like *Elymus arenarius*, var. *villosus*, but more frequent. Anse à Pierre, St. Pierre, August 26, 1899.

Named *A. arenaria* by Bonnet and Delamare.

*Cinna latifolia (Trev.) Griseb.—Swamps and moist woods, R.; not found in St. Pierre. Belle Rivière Valley, Langlade, August 2, 1901.

*AVENA SATIVA L.—Introduced in cultivated ground and persisting several years in the same locality. Phare de Galantry, St. Pierre, on the roadside, August 18, 1902.

*DANTHONIA SPICATA (L.) Beauv.—Dry and rocky places, heathy hillsides and cliffs; C. Phare de Galantry, near Cap Noir, St. Pierre, August 18, 1902.

SPARTINA MICHAUXIANA Hitch.—Damp places, especially brackish marshes, borders of ponds and pools communicating with the sea; C. Sand dunes near Pointe au Cheval and the Grand Barachois, August 24, 1900. There were great masses of the plant on the borders of the Grand Barachois, a great expanse of salt water, 5 square miles in area.

Named *S. cynosuroides* Willd. by Bonnet; not seen by Gautier and Delamare.

*POA ANNUA L.—Introduced from Europe and naturalized; CC. Town of St. Pierre, August 31, 1900. The most common of *Gramineae* in cultivated ground and near dwellings, roads, courtyards, waste places. It is strange that nobody ever recorded this plant.

*GLYCERIA NERVATA (Willd.) Trin.—Wet or inundated ground; C. in Miquelon; not found in St. Pierre. Plain of Mirande, Miquelon, August 26, 1900.

*GLYCERIA BOREALIS (Nash) Batchelder.—Shallow water; C. Plain of Savoyard, St. Pierre, August 26, 1901.

*FESTUCA RUBRA L., var. ORARIA Dumort.—Maritime sands and shingle, brackish meadows; C. Savoyard, St. Pierre, August 26, 1901. Doubtless native.

BROMUS CILIATUS L., var. DENUDATUS (Wieg.) Fernald.—Moist woods; banks of streams; C. Ruisseau des Terres Grasses, Miquelon, July 29, 1901.

It is very likely to this plant that Gautier, and Delamare after him, gives the name of *Bromus canadensis* Michx.

SCIRPUS CAESPITOSUS L., var. CALLOSUS Bigelow.—Swamps, rocky and damp places, reaching the summits of hills; C. Sept Etangs, St. Pierre, June 14, 1900 and May 25, 1901.

Bonnet and Delamare record the type for the variety, which is the only form found in the Islands.

*SCIRPUS SUBTERMINALIS Torr.—In ponds and quiet streams; wholly aquatic with floating leaves; R. Pool in the plain near the Chapeau de Miquelon, July 31, 1901.

*SCIRPUS AMERICANUS Pers.—Salt or fresh water, borders of ponds and streams; R. Banks of Mirande Pond, Miquelon, July 31, 1901.

SCIRPUS RUBROTINCTUS Fernald.—Swamps and marshy borders of streams; C. in Miquelon; R. in St. Pierre. Belle Rivière, Langlade, August 2, 1901.

Named *S. sylvaticus* L., var. *atrovirens* Gray by Bonnet and *S. atrovirens* Muhl. by Delamare.

Eriophorum spissum Fernald, Rhodora, xxvii. 208 (1925).—Everywhere in bogs and marshy plains. Sept Etangs, St. Pierre, July 19, 1900.

Named *E. vaginatum* L. by Gautier, Bonnet and Delamare.

Eriophorum spissum Fernald, var. erubescens Fernald, l. c. 209 (1925).—Bogs; very often with the preceding. Sept Etangs, St. Pierre, July 19, 1900.

Named *E. russeolum* Fries by Bonnet and Delamare.

Eriophorum angustifolium Roth., var. majus Schultz.—In bogs with the type; CC. Sept Etangs, St. Pierre, July 19, 1900.

Named *E. latifolium* Hoppe. by Delamare.

*Carex exilis Dewey.—Bogs and marshes; the most common *Carex* in the Islands: occurs nearly everywhere in watery ground, and nevertheless not yet recorded. Etang du Milieu, Saint Pierre, July 25, 1900.

*Carex canescens L.—Swamps and bogs; CC. St. Pierre, Anse à Ravenel, July 10, 1902, and Etang du Té.égraphe, August 7, 1902.

*Carex canescens L., var. disjuncta Fernald.—With the preceding, perhaps less common. Anse à Ravenel, July 10, 1902. This variety seems very constant; it is a much stronger plant than the type and the length of the inflorescence may reach 15 centimetres.

In 1903, specimens from Sept Etangs, St. P., July 3, 1902, were put under *Carex arcta* Boott by the New York Botanical Garden. I no longer have this material. Prof. Fernald fears there must have been an error of determination since "we do not know of *C. arcta* east of the rich limy valleys of New Brunswick; it is not in Nova Scotia, nor in Newfoundland." I drop *C. arcta* from the list of St. Pierre et Miquelon plants.

*Carex brunnescens (Pers.) Poir., var. sphaerostachya (Tuckerm.) Kükenthal.—Damp or dry places, chiefly rocky or gravelly; high ground; C., but less frequent than *C. canescens*. Point culminant de St. Pierre (204 metres), August 7, 1902.

*Carex trisperma Dewey.—Bogs, damp shaded places; C. Anse à Dinant, St. Pierre, August 13, 1902.

*Carex muricata L., var. cephalantha (Bailey) Wieg. & Eames.—Low ground; C. Ruisseau de Mirande, Miquelon, July 26, 1902.

*Carex stipata Muhl.—Moist woods, marshy borders of streams; R. in Miquelon; not found in St. Pierre. Belle Rivière Valley, July 25, 1901.

*Carex maritima Müller.—Brackish soil, damp saline meadows; C. Near Etang de Savoyard, St. Pierre, June 19 and July 10, 1902.

*Carex salina Wahl., var. kattegatensis (Fries) Almq.—Salt marshes, borders of brackish ponds, pools drying in summer; not R. in Miquelon; not found in St. Pierre. Boggy plain east of Pousse-Trou, Miquelon, July 25, 1902.

*Carex gynandra Schwein.—Damp and boggy woods; grassy borders of streams; C. in Miquelon; not found in St. Pierre. Belle Rivière Valley, June 21, July 19 and August 16, 1902.

Not easy to distinguish from *C. crinita* Lam., which seems rarer in Miquelon. I found *C. crinita* only in Langlade (Ruisseau Lebon, July 15, 1902), perhaps in Beautemps-Beaupré's locality. I did not meet with it in Grande Miquelon, where *C. gynandra* is frequent.

*Carex aquatilis Wahl.—In water: borders of streams and ponds; R. Belle Rivière, Langlade, June 21, 1902. The specimens from this locality, though found sufficiently typical by Professor Fernald are very immature. I had better material from Anse aux Soldats, Langlade, collected on July 15, 1901, but it was lost.

*Carex Goodenovii J. Gay, var. strictiformis (Bailey) Kükenthal.—Damp places; C. Marsh near Pousse-Trou, Miquelon, July 25, 1902.

The type is reported by Delamare. It is very common in damp, and sometimes dry places, and it assumes different forms according to the station where it grows (Belle Rivière, July 20, 1902; Plain near the Village of Miquelon, July 25, 1902).

Carex Haydeni Dewey. (*C. aperta* Carey, not Boott).—Damp woods and bogs; R. Belle Rivière Valley, July 20, 1902.

It is very likely this plant that Bonnet and Delamare named *C. aperta* Boott.

*Carex leptalea Wahl.—Damp shady places; C. St. Pierre: Sept Etangs, August 13, 1902; Anse à Dinant, August 16, 1901. The collection from Sept Etangs is a dwarf form of the plant.

*Carex Buxbaumii Wahl.—Bogs and borders of streams; woods; R. in Miquelon; not found in St. Pierre. Belle Rivière Valley, July 20, 1902.

*Carex gracillima Schw.—Moist woods; C. in Miquelon; R. in St. Pierre. Belle Rivière Valley, June 21 and August 16, 1902.

*Carex scirpoidea Michx.—Cliffs, gravelly and rocky hillsides, high unsheltered places; R. in Miquelon; not found in St. Pierre. Anse à Trois-Pics, Miquelon, July 27, 1901.

*Carex deflexa Hornem.—Dry places, open woods; C. Cap à l'Aigle, St. Pierre, August 7, 1900.

*Carex novae-angliae Schwein.—Dry shady woods, sometimes open places; C. Sept Etangs, St. Pierre, August 7, 1900.

*Carex livida Willd., var. Grayana (Dewey) Fernald, Rhodora, xxviii. 8 (1926).—Bogs and sphagnous swamps; C. Anse à Ravenel, St. Pierre, June 12, 1899 and July 25, 1900.

Delamare reports *C. panicea* L. as CC. in bogs. It is not known in Newfoundland, according to Professor Fernald who writes: "We have no evidence of *C. panicea* from east of Nova Scotia." It is to be feared that Delamare mistook for it *C. livida*, var. *Grayana*.

*Carex pallescens L.—Grassy borders of streams; R. in Miquelon; not found in St. Pierre. Meadow near the Government House, Langlade, August 2, 1901.

*Carex paupercula Michx.—Bogs; dune hollows; R. in Miquelon; not found in St. Pierre. Sand dunes, west of Grand Barachois, Miquelon, July 31, 1902.

*Carex rariflora J. E. Smith.—Boggy and rocky places; ascends the highest plains and hills; C. Sept Etangs, St. Pierre, June 27, 1901.

On the Isthmus of Langlade (sand dunes W. of Grand Barachois, July 16, 1902), I found a form, with loose spikes, of *C. rariflora*, simulating *C. limosa*, and growing with the last. *C. limosa* is more common than *C. rariflora*.

*Carex pedunculata Muhl.—Dry woods, shady and rocky banks; R.; not found in St. Pierre. Les Voiles Blanches, Langlade, July 20, 1902, and June 1, 1903.

*Carex conoidea Schk.—Damp grassy places, bogs; C. Plain of Savoyard, St. Pierre, August 26, 1901.

*Carex lepidocarpa Tausch.—Borders of streams, damp woods; not C.; not found in St. Pierre. Anse aux Soldats, Langlade, August 16, 1902.

I collected in Belle Rivière Valley, August 2, 1901 and June 21, 1902, other specimens of *C. lepidocarpa* which are also deposited at the Gray Herbarium. Prof. Fernald thinks this material might have some crossing with *C. Œderi*, a plant very common in the Islands.

*Carex debilis Michx., var. Rudgei Bailey (*C. flexuosa* Mill.).—Damp shady woods; C. in Langlade; not found in St. Pierre. Tête-Pelée near Anse à Ross, and Belle Rivière, Langlade, July 25, 1901.

*Carex oligosperma Michx.—Swamps and boggy plains; C. in Miquelon; not found in St. Pierre. Plain between the Chapeau de Miquelon and Mirande Pond, July 31, 1901.

*Carex Michauxiana Boeckl.—Bogs, grassy borders of streams; C. in Miquelon, where it is mixed with *C. folliculata* L.; not found in St. Pierre. Mirande, Miquelon, July 31, 1901.

*Carex Hostiana DC., var. laurentiana Fern. & Wieg., Rhodora, xxvi. 122 (1924).—Bogs; R. in Miquelon; not found in St. Pierre. Belle Rivière Valley, June 21 and July 20, 1902.

*Carex rostrata Stokes.—Damp, sometimes inundated places, borders of streams; with the following but less common; not found in St. Pierre. Belle Rivière Valley, Langlade, July 18, 1901.

*CAREX ROSTRATA Stokes, var. UTRICULATA (Boott) Bailey.—Same habitat as the type; C. in Miquelon; not found in St. Pierre. Ruisseau Sylvain, Miquelon, July 26, 1902.

JUNCUS BALTICUS Willd., var. LITTORALIS Engelm.—Sandy places, borders of streams and ponds, often in brackish water; C. Plain near the Village of Miquelon, July 24, 1901.

Named *J. balticus* Willd. by Gautier, Bonnet and Delamare.

JUNCUS EFFUSUS L., var. CONGLOMERATUS (L.) Engelm.—Damp places, CC. Chapeau de Miquelon, July 31, 1901.

Recorded by Gautier and Delamare under the name *J. conglomeratus* L. Prof. Fernald writes: "There is no sharp line between *J. conglomeratus* and *J. effusus* in America. We have intermediate varieties which completely bridge the gap."

*JUNCUS EFFUSUS L., var. SOLUTUS Fern. & Wieg.—Marshy ground, brooksides; R; not found in St. Pierre. Belle Rivière Valley, Langlade, August 30, 1899.

JUNCUS BULBOSUS L.—Damp, inundated places, sandy or muddy borders of streams and ponds; C. North side of Etang de Mirande, Miquelon, July 31, 1901. Prof. Fernald writes: "This plant is very common on the Avalon Peninsula of Newfoundland. Your specimens, though immature, are thoroughly typical of the extreme smaller phases of the species. *J. bulbosus* is treated by Buchenau as *J. supinus* (a later name) and he records it as having been collected by La Pylaie in Newfoundland." Common also on Sable Island.

Very likely this is the plant recorded by Delamare as *J. Tenageia*, a S. European annual, growing also in N. Africa and W. Asia, which may be confused with small erect forms of *J. bulbosus*.

JUNCUS ARTICULATUS L., var. OBTUSATUS Engelm.—Damp sandy (often brackish) soil; C. in Miquelon; R. in St. Pierre. Borders of Etang de Mirande, Miquelon, July 31, 1901. Common on Sable Island in wet dune hollows.

Reported by Delamare under the synonym *J. lamprocarpus* Ehrh. Prof. Fernald writes: "This is a characteristic form of eastern America, but your material is the first I have seen from east of Nova Scotia."

*JUNCUS STYGIUS L., var. AMERICANUS Buchenau.—Marshy ground; R. Ruisseau des Terres Grasses, Miquelon, July 31, 1901.

I did not examine with sufficient care the genus *Juncus*. I intended to study it thoroughly during the summer of 1903, as I had done the genus *Carex* in 1901 and 1902, but I was prevented from doing so by my sudden departure early in the summer of 1903. Delamare records *J. glaucus* Ehrh. which is now known only as a local introduction in New York State, although Coste (*Fl. de France*, I. 449)

gives it as native in boreal America. I did not meet with it, but I did not specially endeavor to find it; it was the same with *J. trifidus, biglumis* and *canadensis*, reported by Gautier. I have left *Juncus glaucus* and *J. biglumis* in the general list of St. Pierre et Miquelon plants though Prof. Fernald writes: "I suspect that Delamare's report of *J. glaucus* was based upon *J. effusus*, var. *Pylaei*, which superficially resembles it. In regard to *J. biglumis* we have no positive evidence of the species from south of the northernmost part of Labrador."

I did not include in the general list "*J. setaceus* L.," reported by Gautier. It is not easy to say which species he refers to: *J. setaceus* Rostk. is not known north of Delaware.

Luzula saltuensis Fernald.—Wooded banks, hillsides; C. Les Voiles Blanches, Langlade, June 1, 1903. "The only material I have seen from east of Nova Scotia." (Prof. Fernald.)

Named by Delamare *Luzula pilosa* DC.

*Luzula campestris (L.) DC., var. acadiensis Fernald, Rhodora, xix. 38 (1917).—Woods and thickets, damp or dry places; C. Cap à l'Aigle, St. Pierre, June 21, 1900. "I have found this variety recently in central Newfoundland." (Prof. Fernald.)

Luzula campestris (L.) DC., var. congesta (Thuill.) Meyer.—Hillsides, wooded or open plains; C. Hill of La Vigie, St. Pierre, August 14, 1902. "I secured var. *congesta* in southern Newfoundland." (Prof. Fernald.)

Gautier and Bonnet record the type which grows in Europe and Asia and perhaps in northwestern America. Very likely they mean either var. *acadiensis*, or var. *congesta* which Delamare gives as the only form of the species in Miquelon. Besides Bonnet referred to the type, not to var. *congesta*, the specimens Delamare sent to the Museum of Paris.

Delamare records also var. *multiflora*, which is very common, but he gives it a specific rank.

*Iris setosa Pall., var. canadensis Foster (*Iris Hookeri* Penny).—Wet, marshy ground (often brackish); CC. Anse à Marc Cadet, St. Pierre, August 2, 1900.

Very often mixed with *I. versicolor* and doubtless confused with it by De La Pylaie, Gautier and Delamare who mention only *I. versicolor*.

Sisyrinchium angustifolium Miller.—Light sandy soil, generally damp; CC. Plain of Savoyard, St. Pierre, July 14 and Sept. 2, 1900.

Named *S. bermudiana* L. by Gautier, and *S. anceps* L. by Bonnet and Delamare.

I do not drop from the list of Miquelon plants *Cypripedium spectabile* (*Cypr. hirsutum* Mill.) reported by Gautier. But it is not impossible that he applied this name to the common bog plant *C. acaule*, not even mentioned by him.

*HABENARIA OBTUSATA (Pursh) Richards.—Swamps and wet woods; C. Anse aux Soldats, Langlade, July 18, 1901.

*HABENARIA HOOKERI Torrey.—Damp places, woods and thickets; R. Heights of Cap à l'Aigle, St. Pierre, June 28, 1903. (Specimens at the New York Botanical Garden.)

HABENARIA LACERA (Michx.) R. Br.—Damp woods; R. in Langlade; not found in Grande Miquelon or in St. Pierre. Belle Rivière Valley, August 2, 1901.

I think the report of *H. lacera* by Bonnet and Delamare is not to be applied to the type which seems to be rare and was found by me only in the woods of Langlade, but to var. *terrae-novae* which is common and the usual form of the species in the Islands.

*HABENARIA LACERA (Michx.) R. Br., var. TERRAE-NOVAE Fernald, RHODORA, xxviii. 21 (1926).—Boggy plains; open places in woods; C. Cap de Miquelon, August 11, 1900.

*HABENARIA PSYCODES (L.) Sw.—Swamps, open marshy or boggy plains; C. Cap de Miquelon, August 11, 1900.

HABENARIA FIMBRIATA (Ait.) R. Br.—Woods; R. in Miquelon; not found in St. Pierre. Belle Rivière, Langlade, July 18, 1901. Blooms a little earlier than *H. psycodes*, and is much less common.

I think the report by Gautier, Bonnet and Delamare of *H. fimbriata* is for *H. psycodes* which they do not mention; so much the more as the last plant grows in the localities given by Bonnet and Delamare for *H. fimbriata*.

*SPIRANTHES ROMANZOFFIANA Cham.—Dry or wet places, sandy or boggy; C. Isthmus of Langlade, August 24, 1900.

I did not find *S. cernua* (L.) Rich., reported by Bonnet, Delamare and Gautier. Perhaps they confused the latter with *S. Romanzoffiana*. But as *S. cernua* is abundant in Nova Scotia and like other Nova Scotian species may have reached St. Pierre et Miquelon, I leave it in the flora.

EPIPACTIS REPENS (L.) Crantz, var. OPHIOIDES (Fernald) A. A. Eaton.—Damp, mossy woods; R. in Miquelon; not found in St. Pierre. Les Fourches, Belle Rivière Valley, Langlade, June 1, 1903.

Named *Goodyera repens* R. Br. by Gautier; not reported by the other observers.

*Listera cordata (L.) R. Br.—Damp woods, in mossy and shady banks; R. in Miquelon; not found in St. Pierre. Les Fourches, Belle Rivière Valley, July 18, 1901.

*Listera convallarioides (Sw.) Torr.—Same habitat as the preceding. Anse aux Soldats, Langlade, July 18, 1901.

*Corallorhiza maculata Raf.—Damp woods, moist shady places; R. in Miquelon; not found in St. Pierre. Wood below Tête-Pelée, Langlade, August 16, 1902.

*Corallorhiza trifida Chatelain.—Same stations as the last; R. Belle Rivière Valley, Langlade, June 21, 1902.

*Salix pedicellaris Pursh.—Bogs, borders of streams and ponds; R. Etang aux Outardes, Miquelon, July 20, 1901; also Belle Rivière, June 1, 1903.

*Salix lucida Muhl.—In the same stations as the preceding; R. Ruisseau Sylvain, Miquelon, July 18, 1902.

*Populus tremuloides Michx.—Wooded valleys; R.; found only in Langlade. Belle Rivière, May 20 and August 16, 1902.

*Populus tacamahacca Mill.—With the preceding; not found in Grande Miquelon or St. Pierre. Belle Rivière, July 25, 1901.

Delamare points out that some observers claim to have found in Langlade *Salix longifolia, purpurea, repens* and *herbacea*. *Salix longifolia* Muhl. does not seem to grow in Newfoundland; I never met with it in St. Pierre et Miquelon, but I collected it in the vicinity of Montreal where it is common. *Salix purpurea* L. is introduced in the eastern States and in Nova Scotia; it may be naturalized in the Belle Rivière Valley. *Salix repens* L. is not recognized by students of *Salix* as growing in America: there is, perhaps, some confusion with *Salix Uva-ursi* Pursh which is common all over the Islands, though Delamare did not record it. *Salix herbacea* L. has been found only in northern Newfoundland, in Arctic America and on the high summits of Gaspé, Maine and New Hampshire; it is not likely that it is native in Saint Pierre et Miquelon.

Myrica carolinensis L.—Wet or dry sandy and rocky places; C., but less frequent than *Myrica Gale* L. which is seen nearly everywhere in damp places. Sept Etangs, St. Pierre, June 27 and August 13, 1901.

Named *M. cerifera* L. by Bonnet.

*Betula papyrifera Marsh., var. cordifolia (Regel) Fern.—Borders of streams, damp woods; C. Anse à Dinant, St. Pierre, May 25, June 27 and July 19, 1900. Only a small shrub.

It is perhaps this plant which is called *B. papyrifera* (the type) by Bonnet and reported by him as growing in St. Pierre in fir woods. I did not meet with the type in St. Pierre and in Grande Miquelon,

but I found it in Belle Rivière and Anse aux Soldats Valleys, in Langlade; Tête Pelée Wood, August 2, 1901. It is a tree that may reach a height of 8 metres, and whose leaves are smaller and very different from those of var. *cordifolia;* their base is truncate, not cordate. The type seems very rare.

Gautier reports *Betula pubescens* Ehrh. for *B. papyrifera* or its variety.

*Betula lutea Michx. f.—Native in the woods of Langlade, where it is rare; not found in Grande Miquelon or St. Pierre. Anse aux Soldats, July 20 and August 16, 1902; Belle Rivière, June 21, 1902. Reaching 8 metres.

Betula Michauxii Spach is reported by Bonnet, on the authority of De La Pylaie, as growing in all low grounds in St. Pierre and also in Miquelon. Delamare and I overlooked it; we collected only *Betula pumila* L., which is very common in moist soil, and which reaches the highest plains and hills. Bonnet also reports *B. pumila.*

Gautier's record of *Betula nana* L. is doubtless for *B. Michauxii.*

Alnus crispa (Ait.) Pursh, var. mollis Fernald, Rhodora, xv. 44 (1913).—Bogs and wet places; CC. Anse à Ravenel, St. Pierre, June 3, 1900.

Named *A. viridis* DC. by Gautier, Bonnet and Delamare.

*Alnus incana (L.) Moench.—Moist woods, borders of streams; R.; found only in Langlade. Belle Rivière, May 20 and July 19, 1902.

Gautier records with *A. viridis* DC., *A. glutinosa* Gaertn. He says: "Ces deux aulnes forment des buissons assez fournis au milieu desquels on trouve, dans les bois de Langlade, le *Corylus americana.*" If *A. glutinosa* grows in St. Pierre et Miquelon, it must have been introduced; perhaps Gautier reports it for *A. incana* which is found in Langlade, but is much rarer than *A. crispa,* var. *mollis.*

Bonnet, no doubt quoting De La Pylaie, says Laportea canadensis (L.) Gaud. is found only "dans les lieux pierreux fréquentés par l'homme." I found this plant in the woods of Langlade at a good distance from dwelling places, and there it seemed to be native; Belle Rivière, August 16, 1902. However, its introduction from the American continent—Nova Scotia or Cape Breton—is not impossible. Professor Fernald writes it was not found in Newfoundland.

Rumex mexicanus Meisn.—Damp (usually brackish) soil; borders of ponds; C. Salt marshes near Etang de Mirande, Miquelon, July 25, 1902.

Named by Bonnet *R. salicifolius* Weinm.

*Polygonum Raii Bab.—Maritime sand and shingle; C. locally. Sandy borders of Grand Etang de Miquelon, July 31, 1901.

Polygonum natans (Michx.) Eaton. See Stanford, Rhodora, xxvii. 158 (1925).—Ponds and quiet streams; C. Etang de Savoyard, September 2, 1900.

An exclusively American plant to which Delamare and Bonnet give the name of the European *Polygonum amphibium* L., var. *natans* Moench.

*Polygonum natans (Michx.) Eaton, forma hartwrightii (A. Gray) Stanford.—Damp sandy places; terrestrial and usually sterile; R. Anse à Ravenel, St. Pierre, shingle bank near the sea, Sept. 2, 1900.

Polygonum Hydropiper L.—Damp places; R. Anse à Ravenel, August 20, 1901. Native.

Reported by Gautier, but not by Bonnet and Delamare.

Polygonum sagittatum L.—Low ground, marshy and peaty plains; C. Anse à Ravenel, August 27, 1902.

Reported only by Gautier.

(To be continued)

THE CASE OF THE GRASS GENUS DILEPYRUM.

Agnes Chase.

The name *Dilepyrum* Michx. has been taken up by Farwell[1] to replace the long-established *Brachyelytrum*, a genus of grasses represented by a single species, *B. erectum* (Schreb.) Beauv., rather common in the eastern United States. The substitution of *Dilepyrum* for *Brachyelytrum* has been accepted by some without verification. Before *Dilepyrum* comes into more general use it seems desirable to correct Mr. Farwell's misconception.

Dilepyrum[2] is described with two species, *D. aristosum* and *D. minutiflorum*. The second species, the type of which is preserved in the Paris Herbarium, where it was examined by Professor Hitchcock in 1907, is *Muhlenbergia Schreberi* Gmel.[3] No specimen of the first, *D. aristosum*, can be found. Elliott[4] refers it with a question to *Muhlenbergia erecta*, indicating at two points in his description his

[1] Midland Naturalist 8: 33. 1922.
[2] Michx. Fl. Bor.-Amer. 1: 40. 1803.
[3] See Types of American Grasses. Contr. U. S. Nat. Herb. 12: 144. 1908.
[4] Bot. S. C. & Ga. 1: 98. 1816.

doubt of the identity. Subsequent authors have referred *D. aristosum* to *Brachyelytrum erectum* apparently without further investigation.

Mr. Farwell states that Michaux's "generic description is more accurately descriptive of his first species, *D. aristosum*, than of his second, [and that] the former must be considered as the type of his genus." Mr. Farwell quotes "valvis—subulato-linearibus, carinatis" as characteristic of the first species, but "subaequalibus," which does not apply to the glumes (in our sense) of the first species, but better to the second, is replaced in his quotation by "—." (In *Brachyelytrum* the first glume is obsolete or nearly so, the second 1 to 2 mm. long.) Mr. Farwell also fails to quote "exteriore apice longius recteque aristata," which is not characteristic of the glumes (in our sense) of either species.

Michaux's generic description of *Dilepyrum*[2] is: "GLUMA simplex, bivalvis: valvis subaequalibus, subulato-linearibus, carinatis; exteriore apice longius recteque aristata." Descriptions of stamens, pistils, and caryopsis follow.

In studying descriptions it is necessary to have in mind the author's terminology. "Gluma" as used by Michaux refers to the husk, "gluma exterior" being the glumes (according to present usage) and "gluma interior" or "calyx" being the lemma and palea. *Agrostis* is described as having "gluma 2-valvis" "cal. 2-valvis," that is, glumes 2 and one floret with lemma and palea. *Trichodium* (species of *Agrostis* in which the palea is wanting) is described as having gluma exterior bivalvis and gluma interior 1-valvis.

It is evident that Michaux regarded the floret of *Dilepyrum* (lemma and palea) as a "gluma simplex," that is, there being no "gluma interior" or "calyx." In *D. minutiflorum* (*Muhlenbergia Schreberi*) the first glume is obsolete and the second minute, and was apparently overlooked. Further, in giving the derivation of the name *Dilepyrum* he says, "*dis*, bis, *lepuron*, palea seu gluma: *a gluma tantummodo bivalvi*." Thus he calls attention to the absence of what we term glumes. He further confirms this interpretation by stating that the genus [*Dilepyrum*] is allied to *Leersia* [in which the glumes are wanting]. On the other hand, in *Brachyelytrum erectum*, assuming, as does Mr. Farwell, that it is the same as *D. aristosum*, the second glume is 1 to 2 mm. long (the first commonly nearly obsolete) and the prolonged rachilla joint is more than half the length of the floret.

It seems unlikely that so keen an observer as Michaux should have overlooked both the well-marked second glume and the prominent prolongation of the rachilla, lying behind the palea. Michaux's description of the panicle "laxa debile" does not well apply to the narrow erect panicle of *Brachyelytrum.* Altogether the identity of *Dilepyrum aristosum* is uncertain.

If one works on a type basis, the second species (*D. minutiflorum*) should be chosen as the type species of *Dilepyrum* because the first one does not accord with the generic description. *Dilepyrum* then becomes a synonym of *Muhlenbergia.* If one attaches the name *Dilepyrum* to the first species (*D. aristosum*) because the second species had been described under *Muhlenbergia,* the genus is uncertain because the species on which it is based has not been identified, and *Dilepyrum* should therefore not replace *Brachyelytrum,* a well-known genus.

U. S. Department of Agriculture.

NOTES ON SOME FRESHWATER ALGAE FROM NEWFOUNDLAND.

Wm. Randolph Taylor and John M. Fogg, Jr.

While on an expedition to Newfoundland in 1926, with Messrs. M. L. Fernald and Bayard Long, the primary object of which was the collecting of flowering plants, the junior author embraced the opportunities thus afforded to make incidental collections of freshwater algae at several widely differing localities. A list of the species procured, as prepared by the senior author, contains records which, because of their novelty or of interesting extensions of range, seem to warrant its preservation in published form.

Collections were made about the Bay of Islands (along the west coast of Newfoundland, 130 miles north of Port-aux-Basques), and in the vicinity of Burgeo (on the south coast, about 70 miles east of Port-aux-Basques). All the collecting was done between September 2 and September 14, 1926.

The freshwater flora of the territory visited promises much of interest in relation to that of the high mountains of eastern British

Columbia[1] and of the arctic-alpine districts of Norway, Sweden and elsewhere.[2]

In general, marked similarities appear in the dominance of *Stigonema ocellatum* or *Scytonema myochrous* as a coating on irrorated rocks, over which hang or float mats of sterile *Zygnema, Spirogyra, Mougeotia* or the Heterokont *Tribonema.* These first three genera very rarely fruit in such situations and so can not be given specific names, but are at best roughly classed by the diameters of their filaments. A greater variety occurs in the basal crust in other localities, where *Stigonema panniforme* (Ag.) Kirch., *Tolypothrix penicillata* (Ag.) Thuret, *Calothrix parietina* and other forms may participate, but this is probably explained by the small number of Newfoundland collections available, as limiting the opportunities for a comprehensive survey. No great abundance of *Nostoc* appears in them, which is also surprising, but this genus seems to play a more important part in the British Columbia than in the Scandinavian flora mentioned. The flora of Coccogonales and of Protococcales appears rather poorer than in British Columbia, and the species differ somewhat, but the facies is the same.

Since the freshwater algal flora of Newfoundland is practically untouched most of the data given here represent new records. It is, unfortunately, not practicable to list the diatoms nor (for the most part) the desmids.

French (or Tweed) Island. This is one of the outer group of islands in the Bay of Islands. It was visited on September 2. Rugged, dripping trap cliffs arise precipitously from a narrow, shelving sandy beach. On the wet faces of these cliffs such flowering plants as *Sagina nodosa, Saxifraga aizoides* and *S. oppositifolia, Plantago juncoides*, var. *decipiens* and a coarse variety of *Artemisa borealis* grew in crevices. The rocks in many places were covered with a slimy green coating, which proved to be due to the presence of *Spirogyra varians* (Hassall) Kützing, here collected with zygospores.

Woody Island, which was visited on September 3, is one of the inner islands (situated almost in the mouth of Humber Arm), and is, therefore, lower and less rugged than the preceding. The main

[1] W. R. Taylor, Rhodora, 1922, 1924, and in preparation.

[2] K. M. Ström. The Alga-flora of the Sarek Mountains. Naturw. Unters. Sarekgebirges u. s. w. 3 (Botanik)[5]: 437–521. 1923; and K. M. Ström. Norwegian Mountain Algae. Skr. Norske. Vid.-Akad. Oslo I (Mat.-Nat. Klasse) 1926[6]: 1–263. 1926.

part of the island (known as Wood's Island) has been burned over and grazed, and, in consequence, presents a discouragingly barren appearance. To the west, however, and separated by a narrow passage, occurs a small island (Woody Island) which has apparently retained its original vegetation. A collection made of *Cephalozia*, etc., from the rills that trickle down the gentle southeastern sandstone slope of this islet was found to contain frequent desmids and diatoms, dominated by *Ulothrix variabilis* Kützing and *Microspora quadrata* Hazen, which were both abundant.

North Arm. The northernmost of the three finger-like inland extensions of the Bay of Islands is North Arm, which was visited on September 4. To the north and west this arm is flanked by a high serpentine ridge. The sharp rocks making up this ridge give the appearance of having been tumbled from a vast hopper and allowed to fall carelessly into place. The aspect thus presented from even a short distance is one of barren desolation, but upon closer approach it may be seen that the slopes of this huge stone-pile are dissected by numerous rivulets, each supporting its own narrow belt of vegetation. *Rhododendron lapponicum* and *Statice labradorica* were frequent in the rock crevices here, while, characterizing the moister belts bordering the diminutive ravines were *Betula pumila* and *Salix candida*, with *Adiantum pedatum*, var. *aleuticum* occurring in chinks right at the water's edge. The wet serpentine rocks were covered with a growth of a sterile *Zygnema* (17 μ), mixed with which were *Scytonema myochrous* (Dillw.) Ag. and *Calothrix parietina* (Naeg.) Thuret, in order of abundance, and some indeterminate *Nostoc*.

Great Barachois. This locality, from which collections were made September 11, is situated on the southern coast of Newfoundland about five miles west of Burgeo. The shoreline throughout this region is formed by gnessic rocks, which slope gradually and in undulating curves to the water's edge, presenting gleaming white bare ledges and peaty depressions, the latter characterized by the occurrence of *Schizaea pusilla*, *Andromeda glaucophylla* and other indicators of acidity.

On the dripping ledges here were collected *Stigonema ocellatum* (Dillw.) Thuret, *Tribonema bombycina* D. & S., and a sterile species of *Zygnema* (15 μ) as the major items, and a long-celled species of *Mougeotia* (11 μ diam., 140 μ–155 μ long).

In the small pools in the hollows on the peaty slopes *Sparganium*

angustifolium, Eriocaulon septangulare and *Utricularia cornuta* occurred characteristically, while the interesting moss of Atlantic America and France, *Sphagnum Pylaesii,* formed in many of them a submerged trailing carpet. *Tribonema bombycina* constituted the major algal item of these pools, and with it were associated frequent specimens of *Dinobryon, Stigonema ocellatum,* occasional *Merismopedia glauca* (Ehrb.) Naeg., *Spirogyra sp.* and, as more rare, *Micrasterias truncata* (Corda) DeBreb, *Chroococcus turgidus* (Kütz.) Naeg. and *C. minutus* (Kütz.) Naeg.

GRANDY BROOK. Visited September 11. Grandy Brook flows south through gneissic hills to enter Little Barachois. Two types of collecting are offered by its peaty and rocky slopes: first, rapidly flowing streams, joining the main course at frequent intervals; second, small pools of standing water in the peaty hollows.

Streams. The wet rocks here were characterized chiefly by a coating of *Stigonema ocellatum* with more loosely attached tufts of *Mougeotia* (18 μ) abundant.

Pools. Here *Utricularia geminiscapa* grew profusely and was covered with a thick algal growth which has yielded the following forms: A sterile *Mougeotia* (48 μ–54 μ diam.) was the major single element, but desmids as a group were exceedingly abundant in individuals and species. *Hapalosiphon luteolus* W. & G. S. West and *Merismopedia glauca* were frequent. The most striking desmids were the two interesting forms *Micrasterias arcuata* Bailey and *M. expansa* Bailey, which range south to Florida and here appear far beyond their most northern record (Massachusetts).[1] They show a single short spine at the tip of each arm, these not appearing in Wolle's figures or descriptions, and the arms of *M. arcuata* are simply curved rather than faintly sigmoid. Prominently associated with these were *M. truncata* and *Hyalotheca dissiliens* (Smith) DeBreb. Other associated organisms included *Rhabdoderma lineare* Schmidle & Lauterborn (notable), *Scytonema myochrous, Aphanothece clathrata* W. & G. S. West, *Oedogonium* (7 μ), *Spirogyra* (18 μ), *Tribonema bombycina,* and, as rare constituents, *Stigonema ocellatum, Chroococcus minutus, C. turgidus,* and *Bulbochaete* (cells 15 μ x 18 μ, bristles abundant). Diatoms were abundant, Heliozoa and *Ceratium* and *Dinobryon* occasional.

[1] The occurrence on the South coast of southern species, on the West coast of Cordilleran and Arctic Scandinavian types, is interesting in connection with parallel relationships of the vascular plants already emphasized by Fernald.

Burgeo. Several large ponds nestle in the sterile gneissic hills around Burgeo. *Potamogeton epihydrus* and *Nymphozanthus variegatus* grew as floating forms in such ponds, while frequent on the shallow muddy bottoms, near the margins, were *Callitriche anceps* and *Elatine minima.* The two latter forms often supported an algal population of which the following representation is typical: *Tribonema bombycina* and the variety *tenuis* Hazen were the major items. *Oscillatoria irrigua* Kützing and *Scenedesmus denticulatus* Lagerheim were of frequent occurrence, and associated with them were *Coelastrum microporum* Naeg. and *Oedogonium sp.* (9 μ). The following were of rare occurrence: *Ankistrodesmus falcatus* (Corda) Ralfs, *Pediastrum Tetras* (Ehrb.) Ralfs, *P. Boryanum* (Turp.) Menegh., var. *longicorne* Racib., *Characium falcatum* Schroeder and *Chroococcus minutus.*

University of Pennsylvania.

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JOURNAL OF

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NOTES ON MYXOMYCETES FROM EASTERN MASSACHUSETTS.

Frank A. Gilbert.

The *Myxomycetes*, or Slime Moulds as they are more commonly called, are a compact group of very interesting organisms whose exact status in the organic world has been the subject of considerable debate. Resembling members of the lowest animal phylum during part of their life, they have been claimed by the zoölogist, notwithstanding the fact that during the remainder of their life, their habits and characteristics are entirely those of plants. This debate has never been settled and so the *Myxomycetes* are rather apologetically included in both plant and animal classifications. Because of their small size and secluded habitats, the *Myxomycetes* are never conspicuous and remain in comparative obscurity, scarcely noticed by the average botanist, neglected by the zoölogist, but a source of keen interest and pleasure to a student of the group.

This article does not pretend to give a complete list of the *Myxomycetes* that occur in this region. MacBride's *North American Slime Moulds* should be consulted in that regard. However, MacBride's monograph, covering the *Myxomycetes* of an entire continent naturally does not give much local information upon the species found in a small area. Details of this sort must be taken up in local floras or in special articles, and it is the purpose of this paper to show, in general, the species that may be found here, with notes as to their habitats and abundance. Although many articles have appeared concerning the phanerogamic flora of eastern Massachusetts, little is known of our local cryptogamic flora and the only previous work

on the *Myxomycetes* of this region, that has come to the writer's attention, is in *The Bulletin of the Bussey Institution* for 1876. Here Dr. W. G. Farlow gives a preliminary list of Fungi found in the "vicinity" of Boston and includes twenty-six *Myxomycetes,* of which three were collected at Eastport, Maine.

Nearly all of the collections given below were made by the writer and most of them during the summer and fall of 1926, although a few were gathered in the two preceding years. With the exception of a number of sets of duplicates for distribution, all specimens are in his herbarium. He is greatly indebted to Dr. William C. Sturgis and Miss Gulielma Lister for determinations of the more difficult species.

CERATIOMYXA FRUTICULOSA (Muell.) Macbr. Exceedingly common on fallen logs and other decaying wood from late spring to about the middle of August. Quite often this species appears in the laboratory upon the substratum of rotten wood used to cultivate the plasmodia of other *Myxomycetes.* As the plasmodium of *Ceratiomyxa* is nearly hyaline, and does not creep over the surface of the wood, its presence is not suspected until it begins to emerge from the substratum and erect its white sporophores. Specimens were collected from Pepperell, Dunstable, Gloucester, and Canton.

CERATIOMYXA FRUTICULOSA (Muell.) Macbr. var. PORIOIDES Lister. (*Ceratium porioides* A. & S.) Reported from Woods Hole by Farlow but specimen not found by the writer.

BADHAMIA AFFINIS Rost. One rather meager specimen was collected from the bark of a stick, on an old wood pile at Manchester.

BADHAMIA LILACINA (Fr.) Rost. Very common throughout the summer and fall. *B. lilacina* is usually confined to swamps, often occuring in large clusters partway up the fronds of *Onoclea sensibilis* and other ferns, or upon grass and leaves. Collections were made from Dunstable, Pepperell, Gloucester, Boxford, Lincoln, Rockport, and Canton.

BADHAMIA MAGNA Peck. Although the writer has a number of specimens from the vicinity of Boston in his herbarium, he has made but one collection of this species himself. This was on the bark of dead *Acer rubrum,* five feet from the ground, at Lincoln.

BADHAMIA RUBIGINOSA (Chev.) Rost. Common in the fall. Specimens were collected on fallen twigs at Hubbardston, Dunstable, and Gloucester, and on decaying *Castanea* bark at Groton.

PHYSARUM CINEREUM (Batsch) Pers. This cosmopolitan species was collected a number of times from Pepperell and Dunstable.

PHYSARUM COMPRESSUM Alb. & Schw. On old cornstalks from rubbish heap; Canton.

PHYSARUM CONFERTUM Macbr. On fallen leaves; Canton.

PHYSARUM CONNATUM Lister. Considerable material was collected on and around pilei of *Polyporus hirsutus* on *Populus* logs, at Pepperell Springs. *Stemonitis fusca* var. *rufescens* and *Trichia persimilis* were collected at different times during the season from the same logs.

PHYSARUM GLOBULIFERUM (Bull.) Pers. On dead wood; Canton.

PHYSARUM LATERITIUM (Berk. & Br.) Rost. Collected twice on dead twigs in swamp; Dunstable.

PHYSARUM LEUCOPUS Link. This species, which is reported as rare in North America by MacBride, was collected on leaves and twigs in a swamp at Dunstable.

PHYSARUM NUTANS Pers. This species although common in North America, was collected but once, at Lincoln.

PHYSARUM SERPULA Morgan. Two collections of this uncommon species were obtained on leaves and twigs in swamps at Dunstable. Miss Lister, in a letter to the writer, says that there has been but one previous report of this species from eastern United States, in recent years.

PHYSARUM SINUOSUM (Bull.) Weinm. One of the most common species during the late summer, occuring on grass and twigs in swamps or on nearly any grassy compost heap. Collections were made from Pepperell, Dunstable, Boxford, Lincoln, Rockport, and Gloucester.

PHYSARUM VIRESCENS Ditm. On moss; Dunstable.

PHYSARUM VIRESCENS Ditm. var. NITENS Lister. On dead leaves in swamp; Dunstable.

PHYSARUM VIRIDE Pers. Very common throughout the summer and early fall. Collected from Canton, Dunstable, Pepperell, Boxford, and Lincoln.

PHYSARUM VIRIDE Pers. var. AURANTIUM Lister. This orange colored variety was not very common but forms connecting it with the species were frequent as were grayish forms which might be included under the following variety; Dunstable.

PHYSARUM VIRIDE Pers. var. INCANUM Lister. Canton and Dunstable.

FULIGO SEPTICA (L.) Gmel. MacBride divides this species into a number of forms, two of which are common. The one most frequently found is form OVATA, with a brown or yellowish, foamy crust. It occurs until late summer around stumps and dead trees, especially of Apple and may be found even in very dry situations. It was collected at Pepperell and Gloucester but was noted at a number of other places. The form LAEVIS with a firmer and more persistent crust was collected at Dunstable and Leverett. The plasmodium of this form is white in contrast to that of the form OVATA which is yellow.

FULIGO SEPTICA (L.) Gmel. var. CANDIDA R. Fries. On *Acer rubrum* stump; Lexington.

CRATERIUM LEUCOCEPHALUM (Pers.) Ditm. This species appeared very plentifully on the shredded inner bark of a *Populus* log at Pepperell Springs.

Craterium minutum (Leers) Fr. Collected twice; on bark at Canton and on dead leaves at Pepperell.

Leocarpus fragilis (Dicks.) Rost. Very common. It nearly always was found fruiting on the stems and twigs of living bushes at from six inches to five feet from the ground. Specimens were collected at Hubbardston, Dunstable, Pepperell, Lincoln, and Gloucester.

Diderma globosum Pers. On leaves and trash at base of bushes; Dunstable and Leverett.

Diderma hemisphericum (Bull.) Horne. This rather rare species was collected on leaves and twigs in swamps, at Dunstable and Pepperell.

Diderma simplex (Schroet.) Lister. This species which is reported by MacBride to be rare in North America was collected once, on bark at Lincoln.

Diderma testaceum (Schrad.) Pers. This species occurs quite commonly in conjunction with *Physarum sinuosum* and *Diachaea leucopoda* in grassy but more or less shaded swamps. During July and August there is scarcely a grassy swamp that does not contain one or all of these species in profusion. Specimens were collected at Pepperell, Dunstable, Boxford, and Lincoln.

Diderma effusum (Schw.) Morg. Occasional in wooded swamps throughout the summer. Considerable material was collected at Dunstable.

Diachaea bulbillosa (Berk. & Br.) Lister. One collection was made at Dunstable.

Diachaea leucopoda (Bull.) Rost. This species was very common in grassy swamps during the summer. It was also found a number of times covering the stems and leaves of low or creeping herbaceous plants in damp woods. Specimens were collected at Pepperell, Dunstable, and Hubbardston.

Diachaea subsessilis Pk. This rare species was found but once; in a swamp at Pepperell.

Didymium Clavus (Alb. & Schw.) Rabh. Reported from Forest Hills by Farlow but specimen not found by the writer.

Didymium nigripes (Link) Fr. This species occurred on dead leaves in a swamp at Dunstable.

Didymium nigripes (Link) Fr. var. xanthopus Lister. This was perhaps the most common form collected, occurring in profusion in practically every swamp visited. Collections were made at Canton, Hubbardston, and Dunstable.

Didymium squamulosum (Alb. & Schw.) Fr. On leaves in swamp; Dunstable and Pepperell.

Mucilago spongiosa (Leyss.) Morg. Aethalia of this species completely covered the stems and lower branches of a currant bush growing by the roadside at Dunstable.

Stemonitis ferruginea Ehr. Common on logs, especially *Populus*. Specimens were collected from Pepperell and Gloucester.

Stemonitis fusca (Roth) Rost. Typical *Stemonitis fusca* was collected at Dunstable and Boxford. In a number of cases specimens were taken, in which the capillital net was undoubtedly that of this species but the delicately reticulated spores were smaller and the whole sporangium was of a lighter color. This form was referred to the following variety. Forms were found also that could not be placed definitely in any one species but combined the characteristics of two or more. They were referred to the one that they most nearly resembled.

Stemonitis fusca (Roth) Rost. var. rufescens Lister. Collected at Pepperell, Gloucester, and Winchester.

Stemonitis fusca (Roth) Rost. var. nigrescens Torr. Collected but once, on decaying wood at Dunstable.

Stemonitis herbatica Peck. Collected a number of times at Canton.

Stemonitis hyperopta Meyl. Collected on bark of *Populus* and other deciduous trees; Pepperell and Gloucester.

Stemonitis splendens Rost. Collected at Waverley and Pepperell.

Stemonitis splendens Rost. var. flaccida Lister. This variety was found covering about six square inches of bark on an old stump of *Pinus Strobus*, at Dunstable.

Comatricha elegans (Racib.) Lister. Collected once at Canton.

Comatricha irregularis Rex. Collected at Pepperell on the inner bark of *Populus*, and at Lincoln on *Acer*.

Comatricha nigra (Pers.) Schroet. Collected at Manchester on *Acer* logs, and at West Roxbury on the stump of some deciduous tree, the identity of which was not established.

Comatricha typhoides (Bull.) Rost. Common. Collections were made from Pepperell, Dunstable, and Salisbury. The latter collection was made from sporangia that covered a fair sized rotten stump, hidden among ferns.

Lamproderma arcyrionema Rost. Collected on *Populus* at Pepperell.

Lamproderma columbinum (Pers.) Rost. One good sized collection was gathered on a partly decorticated *Acer* log at Rockport.

Cribraria microcarpa (Schrad.) Pers. On rotten wood; Pepperell and Canton.

Cribraria piriformis Schrad. On *Chamaecyparis* bark; Milton.

Cribraria rufa (Roth) Rost. Hubbardston and Beverly. The latter gathering was from *Tsuga* bark.

Cribraria tenella Schrad. This species was found in profusion on rotten logs of an old wood pile at Pepperell.

Cribraria tenella Schrad. var. concinna G. Lister. Collected twice at Canton.

Cribraria violacea Rex. This rare species was found once, at Canton.

Cribraria vulgaris Schrad. Reported from Newton by Farlow but specimen not found by the writer.

Dictydium cancellatum (Batsch) Macbr. This species is found occasionally throughout the summer and wherever it occurs seems to be present in large quantities. On one occasion it was found covering the entire lower half of a fence post in a damp pasture. Collections were made from Pepperell and Dunstable.

Licea minima Fr. On rotten pine board; Canton.

Tubifera ferruginosa (Batsch) Gmel. Very common, especially in the fall. Specimens were collected at Pepperell, Milton, Boxford, Leverett, Wenham, Belmont, and Canton.

Dictydiaethalium plumbeum (Schum.) Rost. The aethalia of this species do not appear in great numbers in one locality. Five aethalia were collected on logs at Wenham, Rockport, and Leverett.

Reticularia lycoperdon (Bull.) Rost. This not uncommon but localized species appears each spring upon dead trees at Cambridge. It was also collected in the same vicinity in the fall of 1924. Other collections are from Pepperell and Dunstable.

Enteridium Rozeanum (Rost.) Wing. This species, very common in eastern Massachusetts, has been collected from nearly every locality visited. It usually occurs on decorticated branches and often is infested with larvae before it is completely dried out.

Lycogala epidendrum (Buxb.) Fr. This is one of the most common and conspicuous of Myxomycetes and is quite commonly collected by the novice who takes it for a puffball because of its superficial similarity to certain members of that group. It may occur in nearly any favorable situation but is especially frequent on old pine stumps. Collections were made at almost every locality visited.

Lycogala flavo-fuscum (Ehr.) Rost. Quite in contrast to the preceding species, *Lycogala flavo-fuscum* is quite rare. One collection has been made at Wenham. The single large aethalium was found about five feet from the ground on a dead stump of *Acer rubrum.*

Trichia affinis DeBary. This species is very close to *Trichia persimilis* with which it is united by Professor MacBride. Since the specific difference depends upon the degree of completeness of the reticulation on the spores and as this varies considerably even in one gathering, one scarcely knows where to draw the line between species. The extreme form with a perfect reticulation is comparatively rare in comparison with intermediate forms, and has been collected only at Dunstable.

Trichia contorta (Ditm.) Rost. Collected a number of times on bark, at Dunstable.

Trichia contorta (Ditm.) Rost. var. inconspicua Lister. Collected on bark, especially of *Populus;* Dunstable, Boxford, West Roxbury, and Leverett.

Trichia decipiens (Pers.) Macbr. On bark; Dunstable.

Trichia favoginea (Batsch) Pers. On under side of rotten *Populus* log; Pepperell.

Trichia floriformis (Lev.) G. Lister. On decaying *Ulmus* log, Belmont. The log upon which the specimens were found had on it, in addition: *Arcyria stipata, Arcyria pomiformis, Trichia persimilis, Arcyria denudata, Lycogala epidendrum,* and *Hemitrichia clavata.*

Trichia persimilis Karst. Typical specimens of this species were found only occasionally, but intermediate forms between *T. affinis* and *T. persimilis,* are included here and are very common, growing on rotting logs of all kinds, especially those of *Populus.* Collections were made at Dunstable, Pepperell, Canton, Lincoln, Milton, Belmont, and Hubbardston.

Trichia scabra Rost. Collected at Boxford, Dunstable, and Wenham. The Dunstable specimen was found on a rotten *Acer* log, the entire colony covering an area of approximately eight square inches.

Trichia varia (Pers.) Rost. On wood and bark; Lincoln, Boxford, Pepperell Springs, and Leverett.

Oligonema flavidum (Peck) Mass. Small and scattered colonies were collected on fallen logs at Pepperell Springs.

Hemitrichia clavata (Pers.) Rost. This species is very common and has been collected from nearly every locality visited. Often this species appears in such abundance as to cover the entire under side of a log.

Hemitrichia serpula (Scop.) Rost. This species although common was not found in great abundance. Specimens were collected from Pepperell, Canton, West Roxbury, and Boxford.

Hemitrichia vesparium (Batsch) Macbr. Very common. It has been collected from nearly every locality visited. The sporangia in different specimens vary in color from a shining black to a dull reddish brown.

Arcyria cinerea (Bull.) Pers. This species has been collected from Canton and Pepperell. In the latter place it was found on *Betula.* It is common on various wood substrata in laboratory cultures.

Arcyria denudata (L.) Wett. Very common. This species is present everywhere on logs and decaying wood throughout the greater part of the year. It is rather conspicuous and with the exception of *Lycogala epidendrum* is probably the best known species. Collections have been made from nearly every locality visited.

Arcyria globosa Schw. (*Lachnobolus globosus* Rost.) Specimen collected by Farlow at Newton, in the Farlow Herbarium.

Arcyria incarnata Pers. Collected at Rockport on Salix, and at Lincoln on decorticated Acer.

Arcyria nutans (Bull.) Grev. Common. Specimens have been collected at Canton, Gloucester, and Boxford.

Arcyria occidentalis (Macbr.) Lister. This rather rare species was collected at Dunstable and Leverett.

ARCYRIA OERSTEDTII Rost. This uncommon species has been collected but once, at Boxford.

ARCYRIA POMIFORMIS (Leers) Rost. Common. The scattered sporangia occur frequently on dead pine bark. Collections have been made at Canton, Belmont, Pepperell, Dunstable, and Milton.

ARCYRIA STIPATA (Schw.) Lister. Common. The crowded sporangia are either copper colored or rosy, specimens of the latter shade appearing to be more frequent. Collections have been made at Belmont, Canton, Pepperell, Dunstable, Leverett, Boxford, Lincoln, and Milton.

LACHNOBOLUS CONGESTUS (Somm.) Lister. While collecting at Boxford, the writer came across a fallen down woodpile which being in a more or less advanced stage of decay yielded a number of excellent specimens, among which was a very small fragment of a *Trichia* like form, quite unfamiliar. Upon examining this in the laboratory, it was found to agree with the description of *Lachnobolus congestus* but since this species as far as was known had never been reported from North America, a portion was sent, along with a few other uncommon species, to Miss Lister for verification. She answered that it was indeed *Lachnobolus congestus* and had been collected but once before on this continent, in Colorado by Dr. Sturgis. It is therefore new to eastern United States, but undoubtedly intensive collecting will prove that this species, formerly regarded as European, is widespread if infrequent in this country.

PERICHAENA CHRYSOSPERMA Lister. This inconspicuous species has been collected but once, on bark at Wenham.

PERICHAENA DEPRESSA Lib. Not common. Collected from Dunstable, Boxford, and Lincoln.

DISCUSSION

Of the twenty-nine genera and ninety-three species mentioned in this paper only *Physarum lateritium, Physarum leucopus, Physarum serpula, Diderma hemisphericum, Diderma simplex, Diachaea subsessilis, Comatricha elegans, Cribraria violacea, Arcyria occidentalis,* and *Lachnobolus congestus* can be considered rare enough to be of special interest. The collections of *Physarum serpula* and *Lachnobolus congestus* are especially noteworthy for it is but the second time that *Physarum serpula* has been collected in eastern North America in recent years, and the second time that *Lachnobolus congestus* has been found on this continent.

About thirty-five species may be said to be common and eighteen or twenty to occur in profusion. A person collecting *Myxomycetes* in the region could, during the course of a few months, hardly miss *Ceratiomyxa fruticulosa, Physarum sinuosum, Physarum viride,*

Fuligo septica, Leocarpus fragilis, Diderma testaceum, Didymium nigripes var. *xanthopus, Enteridium Rozeanum, Lycogala epidendrum, Trichia persimilis, Hemitrichia clavata, Hemitrichia vesparium,* and *Arcyria denudata.* Some species such as *Craterium leucocephalum, Mucilago spongiosa,* and *Dictydium cancellatum* while not ubiquitous, when found are present in large amounts, while on the contrary a few species such as *Reticularia lycoperdon* and *Dictydiaethalium plumbeum* although fairly common are not found in any great quantity where they do occur.

As a result of the writer's collections it seems clear that eastern Massachusetts is not especially outstanding with regard to its myxomycetous flora, but does yield rather varied and interesting collections if worked intensively, for the eighty-nine species and varieties mentioned in this paper represent nearly one fourth of the total number of species and varieties of *Myxomycetes* known to science. It seems probable that the extent of the foregoing list is the result, not of any special abundance of *Myxomycetes* in eastern Massachusetts but rather of the particularly intensive collecting that was done. Undoubtedly also, this list could be considerably augmented by collecting in the same area another year, for *Myxomycetes*, unlike most fungi, do not necessarily appear in the same vicinity season after season but often are found only at more or less rare intervals.

Laboratories of Cryptogamic Botany, Harvard University, Cambridge, Mass.

CONTRIBUTION TO THE FLORA OF THE ISLANDS OF ST. PIERRE ET MIQUELON.

Bro. Louis Arsène.

(*Continued from p.* 158.)

*Chenopodium album L.—Introduced in gardens and fields; C. Miquelon Village, August 16, 1900.

Bonnet and Delamare report the related species, *Chenopodium opulifolium* Schrader, which is perhaps only a variety of *Ch. album.*

Delamare says Chenopodium rubrum is also introduced as a weed in gardens; I did not meet with it there. But it grows in the salt marshes near the Grand Barachois of Miquelon, where it certainly is native.

Atriplex patula L.—A weed in gardens and fields; C. Town of St. Pierre, September 29, 1902. Introduced from Europe.

A. latifolia Wahl. is reported by Delamare for this plant or a form of the next.

Atriplex patula L., var. hastata (L.) Gray.—Introduced in cultivated ground; C. Town of St. Pierre, September 20, 1902.

Reported by Bonnet and Delamare under the name *A. hastata* L. Prof. Fernald writes: "This is certainly not a species, differing from *A. patula* only in a tendency to hastate leaves, but in no other character."

*Atriplex glabriuscula Edmonston.—Saline soil; common on maritime sands and shingle banks where it is always spreading; the leaves are mealy and the stem often reddish. Its general appearance is very different from that of the preceding species to which it has been connected by some authors. Surely native. Borders of the Grand Etang de Miquelon, August 14, 1900.

*Salsola Kali L.—Maritime sands; R. Sea-shore near Miquelon Bridge, July 30, 1901.

I never found any species of *Suaeda* or *Salicornia*, but very likely some of these fleshy saline plants are native in St. Pierre et Miquelon.

Bonnet reports *Lepigonum salinum* Fr. and *Lepigonum medium* Fr. (*Spergularia salina* Presl. and *Spergularia media* (L.) Presl.) on the evidence of De La Pylaie whose specimens, for both species, were collected near the Barachois (or port) of St. Pierre. I collected Spergularia salina in a salt marsh near the Grand Etang of Miquelon (August 16, 1900), and also in De La Pylaie's locality in St. Pierre, but I never saw *Spergularia media*. Prof. Fernald thinks the last plant might have been mistaken for *S. canadensis*, "which is rather common in southern Newfoundland."

*Spergula arvensis L.—Introduced from Europe and naturalized in cultivated ground and waste places; C. Farm at Pointe au Cheval, Miquelon, August 12, 1900.

Sagina nodosa (L.) Fenzl.—Wet sandy or gravelly places; R. in Miquelon; not found in St. Pierre. Isthmus of Langlade: sandy hollows of the dunes near the Grand Barachois, south of Grande Miquelon, August 16, 1902.

Reported only by Gautier.

Arenaria peploides L., var. robusta Fernald, Rhodora, xi. 114 (1909).—Maritime sands and shingle, where it covers large areas, but does not blossom much; C. in Miquelon; R. in St. Pierre. Isthmus of Langlade, July 19, 1901.

Reported by Bonnet under the name of *Honkenya peploides* Ehrh. It is astonishing that Delamare did not see this plant which is well established on the sands of the Baie de Miquelon, where he lived for years.

*Stellaria graminea L.—Cultivated ground; introduced from Europe; C. Farm near Savoyard, St. Pierre, July 14, 1900.

Silene acaulis L., var. exscapa (All.) DC. See Fernald & St. John, Rhodora, xxiii. 269 (1921).—Rocky plains and hills; C. in Miquelon. Cap Blanc of Miquelon, July 29, 1901.

Named *S. acaulis* L. by Delamare.

Montia lamprosperma Cham.—Moist places; R. Grand Colombier (an islet near Anse à Henry, St. Pierre), July 10, 1900.

Named *M. fontana* L. by Bonnet.

Nymphozanthus variegatus (Engelm.) Fernald, Rhodora, xxi. 187 (1919).—Still water, ponds and pools; CC. Etang de la Vigie, St. Pierre, August 16, 1901.

Named *Nymphaea advena* Ait. by Bonnet and Delamare, and *Nuphar luteum* Sm. by Gautier.

Ranunculus Flammula L.—Damp places; R.; not found in St. Pierre. Native. Belle Rivière Valley, July 16, 1901.

Reported by Gautier, not by Bonnet and Delamare.

Ranunculus reptans L., var. filiformis (Michx.) Hooker.—This plant reported by Gautier, Bonnet and Delamare, is common in damp places, especially on the sandy or gravelly borders of ponds; Etang du Fauteuil, St. Pierre, July 1, 1900. But I found in Langlade (Belle Rivière, wet sands, July 14, 1902) a form which has leaves a little wider, not strictly filiform, and seems to be near the type *R. reptans* L. This form is rather rare.

Ranunculus repens L.—Low ground, borders of brooks; C. Very likely native: is found far from dwelling places. Cap à l'Aigle, St. Pierre, July 5, 1900.

Reported only by Gautier.

Thalictrum dioicum L.—Rocky and shady places; grassy plains, woods; C. Anse à Ravenel, Saint Pierre, July 20, 1900. Professor Fernald writes: "Very interesting; the only evidence from east of Nova Scotia."

Collected by De La Pylaie; not seen by Gautier and Delamare.

*Fumaria officinalis L.—Naturalized from Europe in the vicinity of dwelling places and cultivated ground; R. On rubbish, Town of St. Pierre, August 26, 1901.

Cochlearia cyclocarpa Blake, Rhodora, xvi. 135 (1914).—Maritime rocks and sandy beaches; not common. Cap Blanc of Miquelon, July 29, 1901; Anse à Dinant, St. Pierre, July 6, 1902.

Named *C. officinalis* L. by Delamare, *C. officinalis*, var. *maritima* Gr. & Godr. by Bonnet, and probably *C. anglica* L. by Gautier.

Gautier reports two distinct species of *Cochlearia*. With *C. anglica*, he gives also *C. danica* L. I did not find it. As it is native in Arctic America, its presence in St. Pierre et Miquelon is not impossible. It may be also that it was confused with another species, for instance *C. tridactylites* Banks, which abounds on the western coast of Newfoundland.

Cakile edentula (Bigel.) Hooker.—Sandy or gravelly sea-shore; C. Anse à Ravenel, Saint Pierre, August 2, 1900.

Named by Delamare *C. maritima* Scop., and by Bonnet *C. maritima*, var. *americana* Torrey.

*Raphanus raphanistrum L.—Naturalized in cultivated ground, waste places, etc.; C. Road from the Town of St. Pierre to Cap à l'Aigle, August 20, 1901.

*Brassica arvensis (L.) Kuntze.—As the preceding, but rarer. Town of St. Pierre, July 10, 1902.

*Brassica nigra (L.) Koch.—As the two preceding species; R. Town of St. Pierre, July 10, 1902.

Gautier records "la moutarde" without any designation of species.

*Sisymbrium officinale (L.) Scop.—Waste places, roadsides; not common and perhaps not yet naturalized. Road from the Town of St. Pierre to the Phare de Galantry, July 16, 1901.

*Cardamine pensylvanica Muhl.—Low ground, wet meadows, borders of streams; R.; not found in St. Pierre. Belle Rivière Valley, June 21, 1902.

De La Pylaie, Gautier and Delamare observed, as I did, *Drosera rotundifolia* L. and *D. intermedia* Hayne, which grow in great quantity, chiefly the first, in the bogs of the Archipelago. But Gautier records also *D. oblongifolia* L. Perhaps he means *D. anglica* Huds. which grows in Newfoundland, but which I did not see in the French Islands. Perhaps also he gives that name to the hybrid between *D. rotundifolia* and *D. intermedia* which is sometimes to be found in bogs when the two plants are intermixed.

*Mitella nuda L.—Damp shady woods, growing in moss; not C.; not found in St. Pierre. Belle Rivière Valley, Langlade, June 21, 1902.

Ribes hirtellum Michx.—Rocky places, damp woods; R. Pointe Blanche, St. Pierre, June 20, 1901.

Named by Bonnet and Delamare *R. oxyacanthoides* L., a different plant confused, for a long time, with *Ribes hirtellum*. See Rhodora, xiii. 148 (1911).

Spiraea latifolia (Ait.) Borkh., var. septentrionalis Fernald, Rhodora, xix. 255 (1917).—Low rocky or gravelly ground, bogs, borders of woods; C. Near the road from Cap à l'Aigle to Anse à Henry, St. Pierre, August 3, 1899.

Named by Delamare *S. salicifolia* L., and by Bonnet *S. salicifolia*, var. *latifolia* Ait. Confused by Gautier with *S. corymbosa* Raf.

Pyrus arbutifolia L. f., var. atropurpurea (Britt.) Robinson.—Swamps and low ground; CC. Sept Etangs, St. Pierre, July 19, 1900.

It is very likely this plant that Delamare calls *P. arbutifolia*, var. *melanocarpa* Willd. and Bonnet *P. arbutifolia* L. f. (the type). Delamare says *P. arbutifolia*, var. *melanocarpa* is common in Miquelon, and Bonnet, in recording the type, takes care to cite Delamare and gives exactly the same localities as he (Chapeau de Miquelon and Terres Grasses): therefore it cannot be denied that they mean the same plant, and I am convinced that it is neither *Pyrus melancarpa* (Michx.) Willd. nor *P. arbutifolia* L. f. (the type), but the var. *atropurpurea* of the last species.

Gautier records distinctly *two different plants;* here are his words: "Le *Pyrus arbutifolia* DC. (*Crataegus pyrifolia* Lam.) dont les fleurs en corymbe, aux pédicelles et au calice tomenteux, ont beaucoup d'analogie avec celles de l'aubépine, et le *P. melanocarpa* Willd. sont de tout petits arbrisseaux qui rampent sur le sol." But his summary description of the first is good for the var. *atropurpurea;* as for the second, which is very common in the vicinity of Montreal, but does not seem to be common in Newfoundland, I think Gautier gives its name to *Amelanchier Bartramiana* Tausch., whose fruits are dark purple or nearly black, and whose pedicels and calyx are glabrate as in *P. melanocarpa*. Gautier does not even mention *Amelanchier Bartramiana*. I think it is prudent not to include *P. melanocarpa* in the list of St. Pierre et Miquelon plants.

Pyrus dumosa (Greene) Fernald, Rhodora, xxiii. 275 (1921).—Damp rocky plains and hillsides; banks of streams, woods; C. Anse à Dinant, St. Pierre, July 19, 1900.

Named *Pyrus americana* DC. by Gautier, Bonnet and Delamare. It was also the name given to it by Dr. Small, of the New York Botanical Garden, in 1907, when I sent specimens to that Institution. In a letter dated March 23, 1926, Dr. Small states that the Miquelon plant was placed since then under *Sorbus decora* Schneider; it is the equivalent of *Pyrus dumosa*.

*Pyrus **Arsenii** (Britton), n. comb. = Pyrus dumosa × arbuti-

folia, var. atropurpurea. *Sorbus Arsenii* Britton in Arsène, Rep. Bot. Exch. Cl. Brit. Isl. vii. 961 (1926).—Plant found at the foot of Chapeau de Miquelon, July 25, 1902.

Intermediate between *P. dumosa* and *P. arbutifolia,* var. *atropurpurea* and most likely a natural hybrid of the two species, which, in the locality cited, grow not far from each other. It resembles *Pyrus fennica* Bab. and *P. intermedia* Ehrh., native in northern Europe, and also *P. spuria* DC. of garden origin, which is supposed to be a hybrid between *P. aucuparia* (L.) Ehrh. and *P. melanocarpa* (Michx.) Willd.

Its leaves are usually, in their inferior part, either pinnate with 1–3 pairs of completely free leaflets, or subpinnate with decurrent leaflets and lobes less and less cut as they go from the base of the leaf; in their superior part, they are simply dentate or lobate-dentate with lobes decreasing as they approach the extremity of the leaf. There are leaves that have an odd leaflet as is often the case in *Pyrus spuria;* sometimes the small, superior leaves of branchlets are quite entire and resemble those of *P. arbutifolia,* var. *atropurpurea.* The floral cymes are much smaller than in *P. dumosa* and about the same size or a little larger than in *P. arbutifolia,* var. *atropurpurea,* but the pedicels and calyx are not so tomentose as in the last named plant. Fructification unknown.

I had no time to determine whether the plant is found in other localities, and I could not study it scientifically, particularly with regard to the variations it may assume and its fructification. It would be interesting to know if it is sterile or not.

On July 19, 1903, after my departure from St. Pierre et Miquelon, I found the same plant at Chaleur Bay, fifty miles north of Miquelon, on the southern coast of Newfoundland. There were two or three individuals in full bloom, but I could not ascertain if the supposed parents grew in the vicinity.

Pyrus dumosa is a shrub reaching, at St. Pierre et Miquelon 2 or 3 metres; *P. arbutifolia,* var. *atropurpurea* is a very small shrub, usually prostrate, and when erect not exceeding 40 centimetres. The hybrid, such as I saw it, either in Miquelon or in Newfoundland, was not quite 2 metres high.[1]

*Amelanchier laevis Wiegand, Rhodora, xiv. 155 (1912).—

[1] I published in the *Report for 1925 of the Botanical Society of the British Isles* a little account of this hybrid, but I gave as one of the supposed parents *P. americana* instead of *P. dumosa.* (Rep. Bot. Soc. Vol. vii. page 961.)

Open rocky ground, dry or damp; C.; often growing with *A. Bartramiana*, but blossoming a week or two earlier. Sept Etangs, St. Pierre, July 5, 1900.

AMELANCHIER BARTRAMIANA (Tausch) Roem.—Same habitat as the preceding, sometimes in swamps; C. Sept Etangs, July 5, 1900.

Bonnet and Delamare report it under the name of *A. canadensis*, var. *oligocarpa* Torr. & Gr.; but they were unaware of the existence of *A. laevis*, which is just as common.

FRAGARIA VIRGINIANA Duchesne, var. TERRAE-NOVAE (Rydb.) Fernald & Wiegand.—Sandy or rocky places; CC. in Miquelon; rather rare in St. Pierre. Cap Noir, St. Pierre, June 28, 1902.

Named *Fragaria virginiana* by Bonnet, and *F. canadensis* Michx. by Delamare. Gautier writes: "Le fraisier est inconnu à St. Pierre," which is hardly a correct statement.

*GEUM MACROPHYLLUM Willd.—Damp woods, borders of streams, ravines; R.; not found in St. Pierre. Ruisseau de l'Anse aux Soldats, July 18, 1901.

RUBUS IDAEUS L., var. CANADENSIS Richardson. See Fernald, RHODORA, xxi. 245 (1919).—Rocky places, woods and thickets; C. Bois Brûlé, near Etang du Télégraphe, St. Pierre, July 18, 1900.

This plant is called *Rubus idaeus* by Gautier and Delamare, and *Rubus strigosus* Michx. by Bonnet. In an additional note to his "Florule," Delamare replaces *R. idaeus* by *R. strigosus*, a correction very likely suggested by Bonnet who, in his own work, places Delamare's specimens from Miquelon under *R. strigosus*.

Rubus idaeus L., var. *strigosus* (Michx.) Max., is abundant in southern Newfoundland; perhaps it grows also in St. Pierre et Miquelon with var. *canadensis* found by me.

RUBUS RECURVICAULIS Blanchard.—Damp places, borders of woods, ravines; C. Ruisseau du Renard, Miquelon, August 13, 1900; Ruisseau du Goéland, St. Pierre, July 10, 1902. "The common Blackberry of all southern Newfoundland." (Prof. Fernald.)

Very likely the plant named *R. canadensis* L. by Bonnet and Delamare.

*ALCHEMILLA ALPINA L.—Rocky places, usually dry; R.; not found in St. Pierre. Belle Rivière Valley, July 16, 1901.

I do not repeat what I have already said of this plant. As it is native in Greenland, there is a likelihood of its occurence in Newfoundland, Labrador and the Gaspé Peninsula.

Gautier records *Rosa pimpinellifolia* L. This plant of the heaths and maritime sands of Europe could exist in Miquelon only as an

introduction. But as Gautier does not record any other *Rosa,* one may suppose he mistook for it *Rosa nitida* Willd. which, as well as *R. carolina* L., is common in the Islands; all the more as the very densely spinous stems of *R. nitida* give it some likeness to *R. pimpinellifolia,* a variety of which, common in the sands of Jersey, has also roseate flowers. I do not leave *R. pimpinellifolia* in the list of St. Pierre et Miquelon plants.

PRUNUS VIRGINIANA L.—Rocky places; borders of streams; R.; not found in St. Pierre. Belle Rivière Valley, September 21, 1900, and June 21, 1902.

Named *P. serotina* Ehrh. by Bonnet and Delamare. *P. pensylvanica* L. f. is much more frequent; it is found in the same localities as *Amelanchier Bartramiana* and *laevis.*

*TRIFOLIUM HYBRIDUM L.—Introduced from Europe in cultivated ground, but rare and perhaps not yet naturalized. Village of Miquelon, July 22, 1902.

*VICIA ANGUSTIFOLIA Roth., var. SEGETALIS (Thuill.) Koch.—Introduced from Europe and naturalized; C. Roadside near Anse à Ravenel, St. Pierre, August 29, 1901.

*VICIA HIRSUTA (L.) Koch.—Introduced in cultivated ground, but rarer than *V. tetrasperma* (L.) Moench. Meadow in the Village of Miquelon, July 31, 1902.

LATHYRUS PALUSTRIS L., var. PILOSUS (Cham.) Ledeb.—Damp places, sandy or marshy borders of ponds and streams; C. Sand dunes south of Pointe au Cheval, Miquelon, July 19, 1901.

Named *L. palustris* L. by Bonnet and Delamare.

*LATHYRUS PALUSTRIS L., var. RETUSUS Fernald & St. John. See St. John: Sable Island, p. 81.—Peaty or sandy marshes; R. in Miquelon; not found in St. Pierre. Pousse-Trou, Miquelon, August 13, 1900.

Near var. *myrtifolius* (Muhl.) Gray under which it was first placed at the New York Botanical Garden; distinguished from it by having the leaflets broadest near the tip. Reported from Sable Island by Dr. St. John.

*OXALIS MONTANA Raf. See Fernald, RHODORA, xxii. 143 (1920).—Damp, shady woods; R.; not found in Grande Miquelon and St. Pierre. Woods of Anse aux Soldats, Langlade, August 16, 1902.

*EUPHORBIA HELIOSCOPIA L.—Naturalized from Europe in cultivated ground; just as common as *E. peplus* L. reported by Gautier and Delamare. Garden in the Town of Saint Pierre, September 19, 1901.

EMPETRUM EAMESII Fernald & Wiegand, RHODORA, xv. 215 (1913).—Rocky barrens, dry exposed slopes and summits of hills, CC. Sept Etangs, May 7, 1903.

Red-fruited plant quite distinct from *E. nigrum* L. with which it very often grows. Gautier and Delamare name it *E. rubrum* Vahl., and Bonnet, who records only *E. nigrum* L., following in this American authors of his time, includes under this last species *E. rubrum* La Pylaie.

The leaves of *E. Eamesii* are smaller and more crowded than those of *E. nigrum;* its stem and branchlets are weaker, and its annual shoots shorter. It reaches the highest points, and takes hold on the denuded rocks, struggling desperately against lichens which, very often, succeed in covering its shoots with their foliaceous expansions.

It is not rare to see the two species forming extensive carpets with their branches intermingled in such a way that it is impossible to separate them. However they never hybridize; in spite of a diligent search, during several years of field experience, I never found any intermediates between them.

Ilex verticillata (L.) A. Gray, var. tenuifolia Wats.—Damp woods, low ground; R.; not so frequent as *Nemopanthus mucronata.* Belle Rivière Valley, Langlade, July 18, 1901.

Named by Bonnet *Prinos verticillatus* L. Prof. Henri Lecomte, of the Paris Museum, was kind enough to communicate to me De La Pylaie's specimens collected in St. Pierre, and on which Bonnet's identification was based; they belong to var. *tenuifolia* and differ in no way from those I collected in Langlade. But *the type,* which is common in Nova Scotia and has been found in the dunes of Sable Island and in southern Newfoundland may also grow in St. Pierre et Miquelon.

*Impatiens biflora Walt.—Damp, low ground, shady woods; not C. Savoyard, St. Pierre, September 1, 1902.

*Hypericum canadense L.—Damp sandy or peaty soil; CC. Plain of Savoyard, St. Pierre, August 26, 1901.

Hudsonia ericoides L.—Cliffs and maritime rocks; dry, sandy or rocky soil; not C. Heights near Anse à Henry, St. Pierre, July 5, 1900. Associated with *Empetrum nigrum* and *Eamesii, Silene acaulis,* var. *exscapa* and *Diapensia lapponica.*

Named *H. tomentosa* Nuttall by Bonnet and Delamare, and *H. montana* Nutt. by Gautier.

Viola pallens (Banks) Brainerd.—Marshy places, along streams; damp woods; CC. Near Etang du Pain de Sucre, St. Pierre, June 3, 1900.

Named *V. blanda* Willd. by Delamare.

Viola labradorica Schrank.—Damp open or shady places; CC. Pain de Sucre, St. Pierre, June 3, 1900.

Named *V. Muhlenbergii* Torr. by Bonnet and Delamare. It is likely that the plant reported by Gautier as *V. canina* L. is *V. labradorica.*

In regard to *Viola palustris* L. recorded by Gautier, Prof. Fernald writes: "I very much doubt the identification, since the only evidence we yet have of the species in Newfoundland is from the Straits of Belle Isle; and southwest of there, it is a strictly alpine plant."

Epilobium angustifolium L., var. macrophyllum (Haussk.) Fernald, Rhodora, xx. 4 (1918).—Low ground, clearings of woods; abundant in new burnt places; C. Woods of the Belle Rivière Valley, August 2, 1901.

Named *E. spicatum* Lam. by Gautier, Bonnet and Delamare.

*Epilobium palustre L., var. monticola Hausskn.—Bogs, wet banks and borders of streams; in the same stations as the type and just as common. Cap Blanc, Miquelon, August 14, 1900; Belle Rivière, Langlade, August 2, 1901.

Epilobium glandulosum Lehm.—Damp, rocky or peaty places; R. Low ground, north of the Town of St. Pierre, August 3, 1901; Terres Grasses, Miquelon, August 29, 1900.

Bonnet and Delamare report *E. tetragonum* L. in the last-named locality: Terres Grasses of Miquelon. This plant has not been observed in America, but by many early collectors was confused with *E. glandulosum.* Gautier reports also *E. tetragonum.*

Œnothera muricata L.—Sandy or gravelly banks and slopes near the sea; R. Rocky landslips of Belle Rivière, Langlade, August 2, 1901.

Bonnet reports *O. biennis* L., meaning, very likely, the preceding species. Gautier mentions "des *Œnothera,*" but does not name any species.

*Œnothera pumila L.—Dry rocky ground; open woods; R. Belle Rivière Valley, Langlade, July 16, 1901.

*Sanicula marilandica L., var. borealis Fernald, Rhodora, xxviii. 220 (1926).—Woods and grassy borders of streams; R.; not found in St. Pierre. Belle Rivière Valley, Langlade, July 16, 1901. This variety in the only *Sanicula* found in Gaspé and Newfoundland.

Æthusa Cynapium L.—Waste places; introduced from Europe and naturalized; not C. Garden in the Town of St. Pierre, August 30, 1901. Reported only by Gautier.

Coelopleurum lucidum (L.) Fernald, Rhodora, xxi. 146 (1919.)—Cliffs and maritime rocks; damp places near the sea; C.; grows very

often with *Ligusticum scothicum* L. Ruisseau du Renard, on the sea-coast, Miquelon, Aug. 21, 1900.

Named *Archangelica Gmelini* DC. by Gautier, Bonnet and Delamare.

Delamare says that Gautier records *Angelica atropurpurea* L., but the latter mentions only "l'Angélique" without any clear designation of species. The name "Angélique" is just as good for *Ligusticum scothicum* which he does not record and which is generally called "Angélique de mer" by the French sailors of Newfoundland. It seems impossible to maintain *Angelica atropurpurea* in the list of St. Pierre et Miquelon plants, although it is native in Newfoundland.

*CORNUS ALTERNIFOLIA L. f.—Moist woods; R.; not found in St. Pierre, where *C. stolonifera* Michx. is common. Belle Rivière Valley, Langlade, July 17, 1901.

Some forms of *Cornus canadensis* L. are near var. *intermedia* Farr. with two small opposite leaves in the middle of the stem, as may be seen in my specimen from Anse à Henry, St. Pierre, July 19, 1900. But I do not remember having seen, in St. Pierre et Miquelon, plants in which these cauline leaves were 1/2 or 2/3 as large as the upper leaves, as is often the case along the St. Lawrence River, in the vicinity of Trois-Rivières and Québec. Generally, when they exist at all, these intermediate leaves are much smaller; 1/4 to 1/6 the size of the upper leaves.

*PYROLA ROTUNDIFOLIA L., var. ARENARIA Mert. & Koch. See Fernald, RHODORA, xxii. 122 (1920).—Open woods, in damp places; same habitat as *Pyrola minor* L. but rarer; not found in Grande Miquelon and in St. Pierre. Anse à Ross woods, Langlade, July 17, 1901.

MONOTROPA UNIFLORA L.—Deep woods, under evergreens; C. in Langlade; R. elsewhere. Belle Rivière Valley, August 24, 1900.

This plant is ignored by Bonnet and Delamare. The latter forgets to mention the fact that Gautier records it. He even writes a short description of the plant, but, as usual, does not give any locality.

ANDROMEDA GLAUCOPHYLLA Link.—Bogs; CC. Sept Etangs, St. Pierre, June 6, 1901.

Named *A. polifolia* L. by Gautier, Bonnet and Delamare.

*EPIGAEA REPENS L.—Sandy or rocky woods, under evergreens; R.; found only in Langlade. Wood near Tête Pelée, August 16, 1902.

GAYLUSSACCIA DUMOSA (Andr.) T. & G., var. BIGELOVIANA Fernald, RHODORA, xiii. 99 (1911).—Sphagnous bogs, with *Kalmia* and *Andromeda*, but not so common. Plain between Anse à Ross and Anse aux

Soldats, Langlade, August 16, 1902. Plant with leaves glandular on both faces. This is perhaps the reason why Bonnet places it under var. *hirtella* Gray, which is essentially a southern form, ranging from Virginia to Florida.

Vaccinium pensylvanicum Lam., var. angustifolium (Ait.) Gray.—Dry plains and hillsides, or peaty barrens; CC. Anse à Pierre, St. Pierre, July 5, 1900.

Named by Bonnet *V. pensylvanicum* Lam.

Gautier records *V. Myrtillus* L., a plant which undoubtedly does not grow in St. Pierre et Miquelon, and he says it is more common than the other species of the same genus. We may suppose that he mistook it for *V. pensylvanicum*, var. *angustifolium;* for another variety of this species was called *V. myrtilloides* by Michaux.

Gautier records also *V. corymbosum* L., never seen by any other observer in the Islands, but which is known in Nova Scotia in several forms.

Vaccinium uliginosum L., var. alpinum Bigel. See Fernald, Rhodora, xxv. 24 (1923).—High plains and barrens, summits of hills, CC. all over the Islands. Sept Etangs, St. Pierre, July 9, 1900.

Named *V. uliginosum* L. by Gautier, Bonnet and Delamare.

Vaccinium Vitis-Idaea L., var. minus Lodd.—Dry rocky places, sometimes in peaty bogs, CC. Sept Etangs, St. Pierre, July 5, 1900.

Named *V. Vitis-Idaea* by Gautier, Bonnet and Delamare.

*Primula veris L.—Dry grassy places; RR. Plain near Etang du Pain de Sucre, St. Pierre, July 5, 1899.

This is the only locality where I found this European plant. Its claim to be native is very doubtful. Prof. Fernald writes: "*Primula veris* has been reported as established at several scattered spots in America. In 1884 Macoun (Cat. Can. Pl. pt. 2, page 310) reported it as well established in a meadow near North Sydney, Cape Breton, and also in meadows on Vancouver Island. In 1885 Britton & Hollick (Bull. Torr. Bot. Cl. xii. 39) reported it as occurring on a roadside on Long Island, New York. In 1917 it was found by Weatherby at Salisbury, Connecticut, and when he recorded it (Rhodora, xxii. 143) he also noted its occurrence at Greene, Maine. In 1922 it was reported (Rhodora, xxiv. page 233) as also established at Braintree, Massachusetts."

Bartonia virginica (L.) B.S.P.—Sphagnous bogs; R.; growing sometimes with *Schizaea pusilla.* Peaty bog on the hillside northwest of the Town of St. Pierre, near the road to Anse à Pierre, August 26, 1901. Professor Fernald writes: "*Bartonia virginica* is particularly

interesting, since this is the first evidence of its occurrence east of Nova Scotia. It is quite unlike the plant of Newfoundland."

This is very likely the plant listed by Bonnet under the name of *Bartonia verna* Muhl.

I did not find either *Bartonia paniculata,* var. *sabulonensis* of Sable Island, or *Bartonia paniculata,* var. *iodandra* of Newfoundland. Further searches might lead to the discovery in St. Pierre et Miquelon of these two varieties.

Gautier records "*Gentiana detonsa* Fries, petite plante gazonnante aux feuilles réunies en rosette radicale." I do not know to which American plant he refers; neither De La Pylaie, nor Delamare nor I have ever found a *Gentiana* in St. Pierre et Miquelon. *G. nesophila* Holm is very near *G. detonsa* and earlier American botanists so called it. It is found on Anticosti and in western Newfoundland. *G. Amarella* (*G. acuta*) and *G. propinqua* are native in Labrador and western Newfoundland.

Convolvulus sepium L., var. pubescens (Gray) Fernald.—Maritime sands and shingle; C. Savoyard, St. Pierre, September 2, 1901. Grows abundantly on sand dunes with *Ammophila breviligulata* and *Elymus arenarius,* var. *villosus.*

Named *C. sepium,* var. *americanum* Sims. by Bonnet; Delamare did not see this plant.

*Myosotis arvensis Lam.—Dry places; fields and roadsides; R. Waste land near Le Calvaire, St. Pierre, August 26, 1901. Doubtfully native.

Scutellaria epilobiifolia A. Hamilton. See Fernald, Rhodora, xxiii. 86 (1921).—Maritime sands and shingle, in damp places; borders of ponds near the sea; C. Etang de Savoyard, St. Pierre, August 29, 1901.

Named by Bonnet *S. galericulata* L. Though *S. epilobiifolia* is found in America, as is the case for *S. galericulata* in Europe, in marshy ground and along streams, I saw it, in the French Islands, only in the habitat mentioned.

*Glecoma hederacea L.—Wet open or shady places; introduced from Europe and found only near dwelling-houses or in cultivated ground; R. Route de Savoyard, St. Pierre, July 14, 1900.

Prunella vulgaris L., var. lanceolata (Barton) Fernald, Rhodora, xv. 183 (1913).—Dry or damp places, in meadows, woods, hillsides and cliffs; CC. Anse à Dinant, St. Pierre, October 3, 1900.

Named *Prunella vulgaris* L. by Gautier, Bonnet and Delamare. The American variety is surely native in St. Pierre et Miquelon,

but it may be that the European plant (the type) has been introduced in cultivated ground.

Lycopus uniflorus Michx., var. ovatus Fernald & St. John. See St. John, Sable Island, p. 92.—Moist soil; C. Plain near Savoyard, St. Pierre, August 29, 1901.

Named *Lycopus virginicus* L. by Gautier, Bonnet, and Delamare.

*Mentha arvensis L.—Wet places; low ground at the base of hills, borders of streams; not C. Savoyard, St. Pierre, August 29, 1901.

Mentha arvensis L., var. canadensis (L.) Briquet.—Low ground; waste places, fields and gardens; R. Town of St. Pierre, August 30, 1901.

Very likely the plant named by Bonnet *Mentha canadensis* L., var. *glabrata* Benth.

Gautier says that, in St. Pierre et Miquelon, "on trouve quelques espèces du genre *Mentha* qui restent cantonnées dans l'enceinte des jardins." This is not the case for *Mentha arvensis* which is found in the interior of the Islands; very likely *Mentha arvensis*, var. *canadensis*, though found in fields and gardens, is also native.

*Veronica scutellata L.—Swamps and wet places; R.; not found in St. Pierre. Belle Rivière Valley, July 25, 1901.

*Veronica officinalis L.—Dry, heathy ground; plains and hillsides, clearings of woods; not C. Plain along the road from the Town of St. Pierre to Savoyard, July 14, 1900.

*Veronica serpyllifolia L.—Damp open or shady ground; grassy plains; C. Anse à Pierre, St. Pierre, June 14, 1900.

*Veronica arvensis L.—Introduced from Europe and naturalized in cultivated ground; C. Anse à Ravenel, St. Pierre, August 17, 1901.

*Veronica agrestis L.—As the preceding; C. Waste ground near Le Calvaire, St. Pierre, August 17, 1901.

It is astonishing that Bonnet and Delamare do not mention a single species of this genus which is well represented in the Islands. Gautier writes: "On trouve plusieurs véroniques et l'euphraise," without giving specific names.

*Melampyrum lineare Lam.—Dry woods; R. Belle Rivière Valley, Langlade, August 2, 1901.

Euphrasia americana Wettst.—Wet open ground; grassy plains and hillsides; CC. Route de Savoyard, St. Pierre, July 14, 1900.

Named *E. officinalis* L. by Bonnet and Delamare.

Utricularia vulgaris L., var. americana Gray.—Ponds and quiet streams; R. Pool in the plain near Le Chapeau de Miquelon, July 30, 1901.

Named by Gautier *U. vulgaris* L.

*Utricularia minor L.—Shallow ponds and pools; C. Plain near Le Chapeau de Miquelon, July 30, 1901. Not found in flower.

*Orobanche terrae-novae Fernald, Rhodora, xxiii. 235 (1927).—Damp woods; R. Wood near Tête Pelée, Langlade, August 16, 1902.

Plantago juncoides Lam., var. decipiens (Barnéoud) Fernald, Rhodora, xxvii. 100 (1925).—Maritime rocks, cliffs; CC. Anse à Pierre, St. Pierre, July 19, 1900.

Named *P. maritima* L. by Gautier, Bonnet and Delamare.

Galium palustre L.—Damp shady places; grassy borders of streams; R.; not found in St. Pierre. Anse aux Soldats, Langlade, August 2, 1901.

Perhaps the plant named by Gautier *G. uliginosum* L., a European species not yet found in America. It may be also that Gautier gives that name to *G. labradoricum* which is common in St. Pierre.

*Galium Claytoni Michx.—Wet ground, swamps; C. Belle Rivière Valley, Langlade, August 24, 1900.

I leave in the general list of St. Pierre et Miquelon plants *Galium trifidum* L., recorded by Bonnet and not found by me. But it is possible that this plant was confused with *G. Claytoni*, which, 25 years ago, grew in the very same locality given in Bonnet's "Florule" or not far from it: bogs near Etang Boulo, at the western end of the harbour of St. Pierre. De La Pylaie's locality as given by Bonnet is: "autour de l'étang qui est au fond du port."

*Galium labradoricum Wiegand.—Damp ground, particularly in sphagnous bogs; C. Anse à Dinant, St. Pierre, June 27, 1901.

*Houstonia **Faxonorum** (Pease & Moore) Fernald, n. comb. *H. caerulea*, var. *Faxonorum* Pease & Moore, Rhodora, ix. 210 (1907). *H. serpyllifolia* Grah. in Bot. Mag. lv. t. 2822 (1828), not Michx. Fl. Bor.-Am. i. 85 (1803).

Damp open ground; borders of streams; R. Anse à Ravenel, St. Pierre, June 3, 1900.

Of this material, Professor Fernald writes:

"Your plants are identical with the abundant specimens from the alpine region of the White Mountains of New Hampshire and are the first authentic specimens known except from the Mt. Washington area. In the Gray Herbarium there is a single collection of it labelled in the handwriting of Asa Gray: 'Plymouth, Mass., in sand, 1861. *H. caerulea*, var. leg. *Rothrock*.' No recent collections from Massachusetts or elsewhere in southern New England are comparable with this one, and the question naturally arises, whether the Rothrock

specimens actually came from Plymouth or whether there was some confusion of data.

"*Houstonia Faxonorum* was treated by Pease & Moore as a variety of *H. caerulea* L., and the difference they emphasized was merely that of the corolla. The plant is, however, of stiffer habit and so much more fleshy that every one of the 127 plants or clumps of it preserved in the Gray Herbarium and the herbarium of the New England Botanical Club has dried very dark; while well prepared specimens of the frailer and less fleshy *H. caerulea* retain a greenish aspect. In *H. caerulea* the cauline leaves and bracts tend to become reduced and narrow; in *H. Faxonorum* they are less reduced and mostly oblong to elliptic or oval. In *H. caerulea* the mature capsules are 2.5–4 (rarely 4.5) mm. broad and the peduncles are only slightly dilated beneath the delicately ribbed to ribless fruiting calyx; in *H. Faxonorum* the capsules are 3.5–5.5 mm. broad and the peduncles are strongly dilated beneath the prominently ribbed fruiting calyx. All these characters are merely matters of degree and to some extent they overlap; but the most important characters occur in the seeds. In *H. caerulea* the perfectly ripe seeds range from 400–650 μ in diameter, with the central depression 150–250 μ across; but in *H. Faxonorum* the seeds run consistently larger, 750–1000 μ in diameter with the depression 300–500 μ across.

"This seed difference added to all the others and coupled with the occurrence of *Houstonia Faxonorum* as a strictly alpine plant in New England (the reputed station at Plymouth being open to serious doubt) and otherwise only far to the northeast of the limit of *H. caerulea,* indicates that it is better to treat it as a boreal species rather than as a variety of *H. caerulea.*"

Lonicera villosa (Michx.) Roem. & Schultes. See Fernald, Rhodora, xxvii. 5 (1925). Damp peaty or rocky ground; CC. Plain near the Phare de Galantry, St. Pierre, June 6, 1901.

Named *Lonicrea caerulea* L. by Bonnet and *L. caerulea canadensis* Lam. by Delamare.

Gautier records two species of *Lonicera: L. villosa* Muhl. and *L. velutina* DC. These two names are very likely synonymous, but he certainly means two distinct plants, for he points out that the fruit of the former is red, and that of the latter, black. Very likely his second name applies to the preceding plant (*L. villosa,* var. *typica*), and his first one to the following which is treated as only a variety,

but whose general appearance is quite different. The *red* fruit was probably immature.

LONICERA VILLOSA (Michx.) Roem & Schultes, var. CALVESCENS (Fern. & Wieg.) Fernald, RHODORA, xxvii. 8 (1925).—Damp places, swamps; R. Ruisseau du Renard, Miquelon, July 16, 1902 (Specimens lost) and Belle Rivière, near Les Fourches, Langlade, June 1, 1903.

LINNAEA BOREALIS L., var. AMERICANA (Forbes) Rehder.—Wet shady places, in woods and thickets; CC. Champ de tir, St. Pierre, July 14, 1900.

Named *L. borealis* L. by Gautier, Bonnet and Delamare.

VIBURNUM CASSINOIDES L.—Damp rocky woods and swamps; C. La Vigie, St. Pierre, August 2, 1900; Belle Rivière, Langlade, August 2, 1901.

This plant, which has also been reported by Gautier, Bonnet and Delamare, is extremely variable in outline of leaf and general luxuriance. I collected in Langlade (Belle Rivière Valley, August 24, 1900), specimens of a particularly vigorous form blooming a little later than the common plant. At the New York Botanical Garden it was named *V. nudum* L., and considered as specifically distinct. But Professor Fernald writes he can get no specific distinction between this more luxuriant specimen (collected on August 24, 1900) and the two others.

CAMPANULA ROTUNDIFOLIA L.—Dry or damp places; meadows, sand dunes, cliffs and landslips along the coast; CC. Anse à Pierre, St. Pierre, July 19, 1900; Cap de Miquelon, August 11, 1900. Presenting many variations according to its *habitat*.

Reported by Bonnet and Delamare. Gautier reports only *C. pusilla* G. (not Haenke as Delamare writes in his Florule), which he describes as a "campanule à feuilles radicales longuement pétiolées." We may suppose that he means the dwarf and rigid form of *C. rotundifolia* found in exposed situations and which is the most common in the Islands (*C. dubia* DC.).

I found at Ruisseau du Renard, Miquelon, on August 13, 1900, a white-flowered *Campanula* which Dr. Small, of the N. Y. Botanical Garden, named *C. Giesekiana* Vest. Of this material, Professor Fernald writes: "I am quite unable to get anything like a specific difference between *C. Giesekiana* and the other variations of *C. rotundifolia*. Even Witasek, who has split the species much finer than anyone is able to follow, treats *G. Giesekiana* merely as a sub-

species of *C. rotundifolia*, and until the American variations of the series can be properly studied it is rather unwise to treat the plant as a species, or anything more than one of the many forms."

Solidago macrophylla Pursh.—Rocky places and woods; C.; R. in St. Pierre. Pousse-Trou, Miquelon, August 20, 1900.

Named *S. squarrosa* Muhl. by Bonnet and Delamare.

Solidago uniligulata (DC.) Porter.—Bogs; sometimes in rocky and dry places; CC. Mirande, Miquelon, July 30, 1901.

Named *S. terrae-novae* T. & G. by Bonnet and Delamare. Professor Fernald writes: "So far as I can make out, *S. terrae-novae* is but an unimportant form of *S. uniligulata*."

Gautier records only one *Solidago: S. canadensis* L. which he says to be very common and which has, however, never been seen by any other botanist. Very likely he gives that name to *S. uniligulata* which is the most abundant species of the genus and reaches the summits of hills where its height does not exceed sometimes a few inches.

*Solidago rugosa Mill., var. villosa (Pursh) Fernald.—Dry rocky places; R. Plain near Savoyard, St. Pierre, August 29, 1901.

Aster umbellatus Mill.—Damp places; woods and borders of streams; C. in Miquelon; R. in St. Pierre. Ruisseau de la Carcasse, Miquelon, August 29, 1900.

Named by Bonnet and Delamare *A. umbellatus*, var. *latifolius* Gray. Professor Fernald writes: "The Miquelon plant is fairly typical; it is certainly not var. *latifolius*."

I exclude from the St. Pierre et Miquelon flora *Aster tripolium* L., recorded by Gautier. It seems unlikely that this European plant of brackish beaches and bogs exists at all in the Islands, even as an introduction. He does not mention any other *Aster*, being satisfied with pointing out that there are others with a single head and belonging to species near *A. alpinum*. There is not much precision in this!

Erigeron canadensis L.—Waste places; R. Perhaps introduced from the American continent. Town of Saint Pierre, August 29, 1904.

Reported only by Gautier.

Anaphalis margaritacea (L.) Benth. & Hook., var. subalpina Gray.—Sand dunes and gravelly banks; dried sandy or rocky bottoms of streams; C. Belle Rivière, September 12, 1901.

Named *A. margaritacea* B. & H. by Bonnet.

*ACHILLEA BOREALIS Bong.—Damp rocky places; cliffs and maritime rocks; C. Native. Savoyard, St. Pierre, August 2, 1900.

ACHILLEA MILLEFOLIUM L. is introduced as a weed in cultivated ground. Gautier, Bonnet and Delamare report only this plant; they do not mention *A. borealis*.

CARDUUS NUTANS L.—Introduced from Europe; R. Town of St. Pierre, September 20, 1902.

Reported only by Gautier.

*CENTAUREA NIGRA L.—Introduced from Europe and thoroughly naturalized in cultivated ground, roadsides and waste places; C. Farm at Savoyard, St. Pierre, August 18, 1901.

*CICHORIUM INTYBUS L.—Introduced from Europe, but rare and casual. Roadside near the Town of St. Pierre, August 16, 1901.

HYPOCHAERIS RADICATA L.—Introduced weed; R. Farm at Savoyard, St. Pierre, August 18, 1901.

Reported only by Gautier.

SONCHUS ARVENSIS L.—Introduced in cultivated ground and naturalized, but far less common than *S. oleraceus* and *asper*. Garden in the Town of Saint Pierre, August 29, 1901.

Reported only by Gautier.

PRENANTHES TRIFOLIOLATA (Cass.) Fernald.—Rocky plains and hillsides; grassy borders of streams; woods and thickets; C. Cap de Miquelon, August 11, 1900.

Named *Prenanthes alba* L. by Bonnet and Delamare, and *Nabalus serpentarius* DC. by Gautier.

(*To be continued*)

THE AMERICAN CARDAMINE PARVIFLORA.

M. L. FERNALD

IN recent American literature *Cardamine parviflora* L. finds a regular place, with no suggestion that it is not quite identical with the Eurasian plant. Examination of the Eurasian and American series, however, brings out certain tendencies which are so constant as to indicate that the American plant is at least a good geographic variety. In fact Dr. O. E. Schulz in his *Monographie der Gattung Cardamine* has well brought out the distinctive characters, here repeated, with slight alterations suggested by more abundant American material:

In typical *C. parviflora* of Eurasia the leaflets of the basal rosettes

oblong and mostly entire; leaflets of the cauline leaves 5–8 pairs; flowers 2–2.5 mm. long; fruiting pedicels 7–10 mm. long; siliques 1–2 cm. long; ovules or seeds 22–36.

The American plant commonly stouter; leaflets of rosette leaves broader, commonly obovate to suborbicular, and usually with 1 or 2 pairs of teeth; cauline leaves with 2–6 pairs of leaflets; flowers 2.5–3.5 mm. long; fruiting pedicels 4–8 (rarely-10) mm. long; siliques 1.5–3 cm. long; ovules or seeds 26–46.

The American variety was described as a species by Michaux who, however, called it *Cardamine virginica* L. It was later taken up by Torrey & Gray as *C. hirsuta, δ virginica* and by Schulz as *C. parviflora,* subsp. *virginica* (L.) O. E. Schulz. It has long been known, however, that *Cardamine virginica* L. was the plant afterward called *Arabis ludoviciana* Hook.; consequently, although Michaux's plant, described as *C. virginica,* was the American representative of *C. parviflora,* we cannot take up *C. virginica* Michx. nor the varietal and subspecific combinations based upon Michaux's misapplication of the Linnean name.[1] Nor can we use for our plant the name *C. hirsuta,* var. *sylvatica* (Link) Gray; for, although Gray described our plant, he misidentified it with the quite different *C. sylvatica* Link. The first available varietal name for the American plant seems to be *C. parviflora,* var. *arenicola* (Britton) O. E. Schulz.

The essential bibliography is as follows:

CARDAMINE PARVIFLORA L., var. ARENICOLA (Britton) O. E. Schulz, Engler's Bot. Jahrb. xxxii. 485 (1903). *C. parviflora* of Am. Auth., not L. *C. virginica* Michx. Fl. Bor.-Am. ii. 29 (1803), as to plant described not as to identification with *C. virginica* L. *C. hirsuta, δ virginica* Torr. & Gr. Fl. i. 85 (1838), as to plant not as to name-bringing synonym, *C. virginica* L. *C. hirsuta,* var. *sylvatica* Gray, Man. ed. 5: 67 (1867), as to plant not as to name-bringing synonym, *C. sylvatica* Link. *C. arenicola* Britton, Bull. Torr. Bot. Cl. xix. 220 (1892). *C. parviflora,* subsp. *virginica* O. E. Schulz, l. c. 484 (1903), as to plant not as to name-bringing synonym, *C. virginica* L.

GRAY HERBARIUM.

[1] The combination *Arabis virginica* is commonly ascribed to Trelease (1891). It was, however, properly made for the Arabis more than 80 years earlier, and instead of *Arabis virginica* (L.) Trel. we should write *A. virginica* (L.) Poir. Encyc. Suppl. i. 413 (1810).

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THE GROUP OF ACALYPHA VIRGINICA IN EASTERN NORTH AMERICA.

C. A. Weatherby

In 1845, in the 34th volume of *Linnaea*, Mueller Argovensis proposed four varieties of *Acalypha virginica* L. (one the typical form, one based on *A. gracilens* Gray, and two original), and he repeated this treatment in more detail in the 15th volume of the Prodromus. With the exceptions of Gray, who made casual mention of one of Mueller's varieties in the fifth edition of the Manual, and Rafinesque, who sprinkled names about with his usual generosity, but with no very sure aim, I find no other author who has recognized more than two species (*A. virginica* and *A. gracilens*) or varieties in the group. A recent investigation of it, however, undertaken in response to a query of Mr. C. C. Deam, convinces me that Mueller was essentially correct; that there are not only two, but three taxonomic entities concerned, readily recognizable when once understood and separated by characters no one of which is perfectly constant, but which in general correlate so well as to make treatment as three species desirable. Mueller's fourth variety shows no specific characters, but may be maintained as a variety under *A. gracilens*.

It is pleasing to find that similar conclusions had been arrived at independently by such excellent taxonomists as Dr. S. F. Blake and Mr. Bayard Long. That confusion has resulted from the failure to recognize the third species (*A. virginica*, var. *intermedia* Muell. Arg.) is sufficiently evident from the herbaria examined. In them it appears sometimes as *A. virginica*, sometimes as *A. gracilens*, sometimes without a name.

I have received indispensable assistance from Dr. Blake, who generously turned over to me his notes on specimens in old European herbaria, and from Mr. Deam, who lent me not only the large representation of the group in his private herbarium, but his critical notes on the specimens. I have had the privilege of examining the specimens in the herbaria of the New York Botanical Garden and of the Torrey Botanical Club. To all who have aided me, my hearty thanks are proffered.

Specimens cited are in the Gray Herbarium unless otherwise noted. "N. Y." indicates the herbarium of the New York Botanical Garden; "N. E. B. C." that of the New England Botanical Club.

A. Pistillate bracts deeply cut into 5–7 (rarely 9) oblong to lanceolate acute or obtusish lobes, beset, at least when young, with long-stipitate whitish glands, sometimes ciliate but not hispid; primary leaves mostly ovate to rhombic-ovate, on petioles ⅓ to nearly as long as the blade, the leaf-tissue glabrous except for scattered long hairs B.

B. Seeds 1.6–1.8 mm. long . . . . *A. virginica.*

B. Seeds 2.5–3 mm. long . . . . *A. virgin., var. Deamii.*

A. Pistillate bracts with 9–15 lobes or teeth; primary leaves mostly ovate-lanceolate to linear, often pubescent beneath or on both surfaces C.

C. Pistillate bracts rather deeply cut into mostly lanceolate, very acute lobes, hispid on nerves and margin, usually not glandular; stems with at least a few long, spreading hairs, often villous; primary leaves broadly to narrowly lanceolate, tapering to a blunt point, on petioles ⅓–½ as long as the blade . . . . *A. digyneia.*

C. Pistillate bracts shallowly cut into ovate or broadly deltoid lobes or teeth, sparsely beset with stipitate whitish or sessile red glands, sometimes ciliate, otherwise glabrate to coarsely pubescent; stem puberulent to pubescent with incurved or ascending hairs; primary leaves oblong-lanceolate to linear, mostly obtusish or abruptly contracted to apex, on petioles $^1/_4$–$^1/_{10}$ as long as the blades D.

D. Capsules mostly maturing 2–3 seeds; lower branches, when present, arcuate-ascending E.

E. Staminate spikes 5–15 mm. long; pistillate bracts approximate if more than one; plant usually finely and sparsely pubescent; leaves oblong-lanceolate, or at least not linear; branches mostly numerous in vigorous plants . . *A. gracilens.*

E. Staminate spikes 2–4 cm. long; pistillate bracts, if more than one, often distant; plant usually rather densely pubescent; branches usually none or weakly developed; leaves commonly linear . . . . *A. gracilens*, var. *Fraseri.*

D. Capsules usually maturing only 1 seed; whole plant coarsely and densely pubescent, when well developed with numerous strongly ascending subfastigiate branches; staminate spike 1 cm. or less long . . . . *A. gracilens*, var. *monococca.*

Acalypha virginica L. Sp. Pl. 1003 (1753), excl. syn. Fl. Zeyl.

and Gronov. *A. caroliniana* Walt. Fl. Car. 238 (1788)?, certainly "*A. caroliniana* Walt." Michx. Fl. Bor. Am. ii. 216 (1803). *A. crenulata* Raf. New Fl. i. 44 (1836) as to synonym cited. *A. rhomboidea* Raf. op. cit. i. 45 (1836). *A. virginica α genuina* Muell. Arg. Linnaea xxxiv. 44 (1865).—Stem simple or with widely spreading branches from the lower nodes, puberulent with incurved hairs (often only in lines) or nearly glabrous, very rarely with a few long, spreading hairs; primary leaves ovate-lanceolate to rhombic-ovate, tapering to a blunt apex, coarsely crenate or crenate-serrate, the margins slightly appressed-ciliate, the nerves beneath and mid-vein above sometimes puberulous, otherwise glabrous except for a few coarse appressed white hairs; petioles from ⅓ to nearly as long as the blades, mostly ½ as long or more, puberulent like the stem; leaves of the branches narrower and with shorter petioles; pistillate bracts strigillose on nerves and margins, sometimes long-ciliate, but not hispid, sparsely beset with long-stipitate, more or less deciduous, whitish glands or rarely quite glabrous, its 5–7 (–9) deep lobes oblong to lanceolate, acute or obtusish; staminate spike 4–10 mm. long, usually not exceeding the bract; seeds 1.6–1.8 mm. long. Like other annuals, varies greatly in size, plants in arid situations being often only 15 cm. tall with primary leaves 2–3 cm. long, in rich soil reaching 5.5 dm. in height, with primary leaves 5–8 cm. long.—Nova Scotia, Maine and Southwestern Quebec to Minnesota (according to MacMillan) and Nebraska, south to Florida, Tennessee and Kansas. Apparently rare southward.

The following specimens, mostly from numbered sets, are representative. QUEBEC: Ironside, Vallée de la Gatineau, Aug. 20, 1921, *Fr. Rolland*, no. 15932. MAINE: fields, Orono, Sept., 1890, *Fernald*. NEW HAMPSHIRE: dry soil, roadsides, Hampton Falls, Sept. 22, 1901, *B. L. Robinson*, no. 740. MASSACHUSETTS: roadside, Concord, Oct. 9, 1898, *Greenman*, no. 497. CONNECTICUT: New Haven, *D. C. Eaton*. NEW YORK: Ithaca, Sept. 10, 1915, *C. C. Thomas*, no. 4490; exposed bar at east end of Beebe Lake, Ithaca, Aug. 27, 1913, *Palmer & Eames*, no. 749. NEW JERSEY: Deans, July, 1891, *Halsted's American Weeds*, no. 86. MARYLAND: moist places, Cabin John, Oct. 10, 1912, *Maxon*, no. 5961. WEST VIRGINIA: bed of Shaver's Fork near Parsons, Tucker Co., Sept. 9, 1904, *Greenman*, no. 404. FLORIDA: Chattahoochee, *Curtiss*, no. 2513. ONTARIO: Ottawa, Aug. 13, 1894, *Macoun*, no. 5891. INDIANA: low place in woods along Tippecanoe River near Leiter's Ford, Sept. 14, 1921, *Deam*, no. 34691. KENTUCKY: near Poor Fork P. O., Harlan Co., Aug., 1893, *Kearney*, no. 275. ILLINOIS: old cornfield, Riverdale, Sept. 7, 1906, *Lansing*, no. 2622. IOWA: ledges, Boone Co., Aug. 15, 1896, *Pammel & Ball*, no. 196. KANSAS: low ground, Riley Co., July 9, 1895, *J. B. Norton*, no. 487. NEBRASKA: Paddock, July 28, 1893, *Clements*, no. 2793.

Like many another Linnaean species, *Acalypha virginica* is a complex and it is necessary to restrict the application of the name to one of the constituent elements. This was done, in effect, by Mueller when he established his *A. virginica α genuina*, and his decision should stand. A statement of the case in detail may, however, be worth while.

There is no diagnosis originating in the Species Plantarum, Linnaeus merely citing phrase-names from earlier works. These citations include a plant of Ceylon (Linnaeus, Fl. Zeyl. no. 342), presumably *A. brachystachya* Hornem.; but in view of the name chosen for the species by Linnaeus and universal usage since, this may be at once excluded for purposes of typification. The other references are to Linnaeus's Hortus Cliffortianus 495 and Hortus Upsaliensis 290, Plukenet's Almagestum 248, t. 99, fig. 4,[1] and Gronovius's Flora Virginica 116.

Of the works cited, the earliest in point of time is that of Plukenet. His phrase-name would apply to any member of the group. His figure represents the upper portion of a plant with ovate-lanceolate, crenate-serrate leaves on petioles ⅓ to ½ as long as the blade, and with long and prominent staminate spikes. The latter condition is rare in *A. virginica* as here understood, but frequent in *A. digyneia;* taken by itself, the figure could be as well, or better, referred to that species and was perhaps so understood by Michaux and Willdenow. Dr. Blake's notes, however, state that the specimen in Plukenet's herbarium "which is the original" of the figure is *A. virginica α genuina* of Mueller.

Clayton's no. 201, on which the Gronovian reference rests, is, as shown by Dr. Blake's notes and a tracing of the specimen in the Gray Herbarium, *A. digyneia.*

Of Linnaeus's own works, the Hortus Cliffortianus merely refers back to Plukenet, adding, however, in the diagnosis a phrase "involucris femineis obtusis" which could hardly apply to *A. digyneia.* In the Hortus Upsaliensis we get a more definite clue, not indeed in the description, but in the statement that the plant concerned had

[1] The reference in the Species Plantarum is actually to "Burm. Zeyl." an error which is corrected in the second edition. Even without the correction, the correspondence of phrase-name and plate-number to citations of Plukenet in the earlier works of Linnaeus, as well as the facts that there is no page 248 in Burmann's Thesaurus Zeylanicus and no figure 4 in his plate 99 and that that plate represents a species of *Cleome,* would show that Plukenet was intended.

made itself only too much at home in the "Caldarium" and "Vaporarium" of the Upsala garden.[1] There was then, a plant which Linnaeus had seen in the living state; according to Mueller, there is a specimen of it in the Linnaean herbarium. This specimen may reasonably be taken as the type of the species; Mueller, who had a clear understanding of the groups involved, determined it as his *A. virginica α genuina.*[2] The name *virginica* is accordingly here applied in that sense.

This is happily in accord with usage for some 75 years past; earlier authors, however, made a different interpretation. As shown by his description and a fragment of his specimen in the Gray Herbarium, Michaux applied the name *A. caroliniana* Walt. to the plant here called *A. virginica,* and *A. virginica* L. to *A. digyneia.* Whether he was correct in his use of Walter's name can now hardly be made out. There is no specimen of *A. caroliniana* in the Walter herbarium; his description calls for a combination of villous, crenate involucre and ovate, serrate leaves which hardly exists in fact. Dr. Blake's notes state that Walter's *A. virginica,* which is represented in his herbarium, is actually the plant here so called. Elliott and Rafinesque can, it would seem, hardly be right in identifying *A. caroliniana* Walt. with the plant now called *A. ostryaefolia;* it appears scarcely possible that Walter would have failed to mention the spicate inflorescences of that species.

Willdenow, Pursh, Beck and the earlier editions of Eaton (up to the fifth) followed Michaux's treatment. With the publication of Gray's Manual and his segregation of *A. gracilens* (a species apparently overlooked by earlier authors or, if known to Rafinesque, not intelligibly described by him) the name *virginica* came more and more to be applied primarily to the broadest-leaved of the three plants, except by Wood, who never recognized *A. gracilens.*

A. VIRGINICA L., var. **Deamii** n. var., planta valida, 3.6–6.8 dm. alta, fere glabra; foliis primariis late rhombeo-ovatis 7.5–10.5 cm. longis 4.5–6.5 cm. latis, teste collectore pendulis, petiolis longitudinis pro ¾ laminam aequantibus; capsulis seminibusque magnis, eis 2.5–3 mm. longis.

Plant large, 3.6–6.8 dm. tall, nearly glabrous; leaves broadly rhombic-ovate, 7.5–10.5 cm. long, 4.5–6.5 cm. wide, according to the collector drooping, the petioles about ¾ as long as the blade; seeds

[1] "Hospitatur in *Caldario* & *Vaporario,* ubi nimis luxuriat & se ipsam multiplicat, annua" Hort. Ups. 291.

[2] Mueller's statement is merely this, in the synonymy of *A. virginica α genuina:* "*A. Virginica* L. Hort. upsal. p. 290 (fide herb. Linn.!)". But there can be no doubt of its meaning.

2.5–3 mm. long, the capsules correspondingly large.—*A. urticifolia* Raf. New Fl. i. 45 (1836)?—Southern Indiana: Roadsides along Whitewater River northeast of Logan, Dearborn Co., Oct. 20, 1924, *Deam*, no. 41,107, type in herb. Deam (isotype in Gray Herb.); low place in woods, 9 mi. north of Rockport, Spencer Co., Oct. 11, 1916, *Deam*, no. 22,351 (hb. Deam); moist bank of Patoka River, 4 mi. southwest of Patoka, Oct. 7, 1917, *Deam*, no. 24, 201 (hb. Deam).

Individual plants of typical *A. virginica* nearly as large as those of this variety can readily be found in rich habitats, but in them there is no increase in size of seed and capsule. The further fact that Mr. Deam's plant is found essentially uniform in character along the southern border of Indiana across the whole width of the state indicates that it is a real genetic development, worthy of taxonomic recognition. Mr. Deam states that the leaves regularly droop, as in *A. ostryaefolia,* and that they do not in ordinary *A. virginica.*

This may be *A. urticifolia* Raf. which was said by him to be "sesquipedal, smooth," to have ample, ovate, acute leaves, and to occur in western Kentucky and Tennessee, a region in which var. *Deamii* might naturally be found. The capsules of the latter, however, are neither smooth nor scrobiculate, as described by Rafinesque. His plant was certainly some form of *A. virginica,* whether this variety or not can hardly be made out. In any case, the name is invalidated by the earlier *A. urticifolia* Poir. (1804).

A. digyneia Raf. Fl. Lud. 112 (1817). *A. virginica* L. Sp. Pl. 1003 (1753), as to syn. Gron. only. "*A. virginica* L." Michx. Fl. Bor. Am. ii. 215 (1803), also of Willd., Pursh, Elliott, and Raf. *A. crenulata* Raf. New Fl. i. 44 (1836), as to plant described? *A. brevipes,* var. *pubescens* Raf. l. c.? *A. virginica β intermedia* Muell. Arg. Linnaea xxxiv. 45 (1865).—Stem simple or with horizontally spreading or loosely ascending branches from the lower nodes, densely puberulent or pubescent with short incurved hairs and nearly always with at least a few long, straight, spreading hairs also, often villous; petioles pubescent like the stem, those of the primary leaves ⅓–½ as long as the blade; blades mostly ovate-lanceolate to narrowly lanceolate, tapering to a blunt point, shallowly and remotely crenate, with short, coarse, sparse, appressed white hairs or sometimes pubescent above, beneath more or less pubescent with short, fine, straight hairs or rarely glabrate, mostly 4–5 cm. long and, even when larger, rarely exceeding 2.5 cm. in width; pistillate bract cut rather deeply ($^1/_3$–$^3/_5$ of its height) into 9–15 (usually 9–11) narrowly lanceolate sharply acute lobes, more or less hispid on nerves and margins, sometimes also pubescent, very rarely glabrate, usually glandless; staminate spike usually about 1 cm. long, equalling or somewhat surpassing the

bract, sometimes elongate, up to 2 cm. long, and bearing 1 or 2 small pistillate bracts well above the base; all the valves of the capsule maturing seeds; seeds 1.4–1.8 mm. long.—MASSACHUSETTS: Jamaica Plain, *Faxon;* Winchester, Oct. 20, 1901, and Milton, Sept. 20, 1908, *Kennedy;* Westford, Aug., 1921, *Fletcher;* Waltham, Aug. 13, 1866, and Ipswich, Sept. 28, 1856, *Wm. Boott;* Rowley, Aug. 10, 1918, *A. P. Morse;* Middlesex Fells Reservation, Sept. 23, 1920, *Kidder* (N. E. B. C.); Canton, Sept. 30, 1903, *A. S. Pease,* no. 2825 (N. E. B. C.); sandy soil, open ground, Fall River, Aug. 15, 1913, *S. N. F. Sanford,* no. 395 (N. E. B. C.). RHODE ISLAND: waste ground, Middletown, Oct. 2, 1896, *M. B. Simmons* (N. E. B. C.). CONNECTICUT: dry hillside, Franklin, Aug. 28, 1906, *R. W. Woodward;* Saybrook, Oct. 4, 1908, *Kennedy.* MARYLAND: Salisbury, Sept., 1865, *Canby;* Bethesda, Sept. 10, 1899, *Steele;* woods near shore, Annapolis, Oct. 17, 1909, *H. H. Bartlett,* no. 1849 (hb. Deam). SOUTH CAROLINA: waste soil, Anderson, Aug. 24, 1920, *John Davis,* no. 1778. KENTUCKY: near Poor Fork P. O., Harlan Co., Aug., 1893, *Kearney,* no. 139. INDIANA: woods near Vernon, Jennings Co., July 23, 1922, *Deam,* no. 37,074; open exposed place on top of wooded knob near Brownstown, Jackson Co., Oct. 10, 1920, *Deam,* no. 33,535; open white and black oak woods near Corydon, Harrison Co., Sept. 5, 1915, *Deam,* no. 18,662; roadside near Worthington, Green Co., Sept. 22, 1921, *Deam,* no. 35,028; along a wood road near Princeton, Gibson Co., Sept. 21, 1921, *Deam,* no. 35,087; open woods near Metamora, Franklin Co., Sept. 17, 1915, *Deam,* no. 19,121; open woods near New Albany, Floyd Co., Sept. 1, 1912, *Deam,* no. 12,261; roadside near St. Anthony, Dubois Co., Sept. 29, 1925, *Deam,* no. 42,647; along low bank of Beanblossom Creek near Helmsburg, Brown Co., Oct. 15, 1911, *Deam,* no. 10,311; cultivated fields, Clarke Co., Aug. 30, 1909, *Deam,* no. 5437; roadside near Leavenworth, Crawford Co., Oct. 5, 1920, *Deam* no. 33,430. The Indiana specimens are all in hb. Deam. ILLINOIS: Urbana, Sept. 24, 1898, *Gleason,* no. 17; dry woods near Catlin, Vermilion Co., Sept. 23, 1912, *O. E. Lansing,* Jr., no. 3480; damp woods, Peoria, July, 1914, *MacDonald;* clayey bank of creek near Athens, Menard Co., Aug. 25, 1916, *Lansing & Sherff,* no. 28. MISSOURI: dry ground, Jackson Co., Aug. 14, 1893, *Bush,* no. 334A; St. Francois Co., Sept. 10, 1893, *Bush,* no. 121 (N. Y.); Jerome, Oct. 25, 1914, *J. H. Kellogg,* no. 519 (N. Y.). OKLAHOMA: edge of creek, near Pawhuska, Osage Co., Aug. 9, 1913, *Stevens,* nos. 1962 and 1988; moist woods near Tishomingo, Johnston Co., Oct., 1915, *H. W. Houghton,* no. 3339. TEXAS: low woods, Tarrant Co., Sept. 29, 1912, *Ruth,* no. 287; Weatherford, Oct. 20, 1902, *Tracy,* no. 8348 (distributed as *Parietaria pennsylvanica*).

The above-cited specimens show the range and scope of variation of what is doubtless the normal state of the species. *A. digyneia* Raf. was, however, apparently founded on an extreme, almost teratological,

form in which the staminate spikes are elongate and one or more of the usual two or three pistillate bracts are born on it well above its junction with the common peduncle, instead of being, as commonly, approximate at the summit of the latter. Sometimes, with still further elongation of the axis, these upper pistillate inflorescences develop subtending leaves and ultimately staminate spikes of their own, and the inflorescence thus passes into a normal branch. The form is of considerable morphological interest, as furnishing material for the study of the evolutionary relation between the congested inflorescence of the normal *virginica* type, the axillary spicate inflorescence of such species as *A. ostryaefolia* and *A. neomexicana*, and normal branches. Its lengthened spikes are, however, not associated with any other character, and it appears not to demand taxonomic recognition.

Of this, strictly speaking, typical form of the species, the following specimens have been seen. Georgia: dry hillside, Cobb Co., July 12, 1900, *Harper*, no. 28. Indiana: pasture near Shawnee Bridge, Fountain Co., Aug. 25, 1915, *Deam*, no. 18,190 (hb. Deam). Illinois: rich, wooded hillside, Grand Tower, Aug. 18, 1900 and July 4, 1902, *Gleason*, nos. 2458 and 2459; without definite locality or date, *Vasey*. Tennessee: near Wolf Creek Station, Cocke Co., Aug. 31, 1897, *Kearney*, no. 884 (N. Y.).

Similarly elongate staminate spikes occur in *A. gracilens*, var. *Fraseri* and might raise some question as to the application of Rafinesque's name. His description, however, and the more detailed one of Robin on which his is based, call for a "tomentose" stem and petioled, dentate, "cotonneuse" (translated by Rafinesque "villose") leaves 6 or 7 lines wide. Since the petioles in *A. gracilens*, var. *Fraseri* are very short and the leaves only obscurely crenate and particularly narrow even for that species (never over 1 cm. or about 5 lines, wide), there can be little doubt that *A. digyneia* was based on the plant here treated under that name.

Although many of the specimens above cited were distributed as *A. virginica*, *A. digyneia* is readily separable from that species. It is nearer *A. gracilens;* small individuals often closely approximate the habit, leaf-form and size of that species, and two specimens which I have seen (*Deam* nos. 19,121 and 42,647) are hardly to be separated from it except by the character of their pubescence. Nevertheless as stated in the introduction, the correlation of characters is ordinarily good and the plant seems best treated as a species.

A. GRACILENS Gray Man. 408 (1848). *A. virginica* γ *gracilens* Muell. Arg. Linnaea xxxiv. 45 (1865). *A. virginica* γ *gracilescens* Muell. Arg. in DC. Prod. xv, pt. 2. 870 (1866).—Stem pubescent with short incurved or ascending hairs, very rarely with a few spreading hairs, simple or in well-developed plants with horizontal, arcuate, or laxly ascending branches from the lower nodes; petioles pubescent like the stem, ⅛ to ¼ the length of the blade, usually not longer than the inflorescence; blades of the primary leaves oblong-lanceolate to linear-lanceolate, 1.5–5.5 (8) cm., long (mostly 3–4 cm.), shallowly crenate, usually rather abruptly contracted to the obtuse or acutish apex, sometimes more gradually tapering, glabrous, with sparse appressed hairs above and puberulence on the nerves beneath, or more or less pubescent on one or both surfaces, the margins ciliolate; pistillate bract cut ¼ to ½ its height (usually less than ½) into 9–11 broadly oblong, triangular-ovate, or broadly deltoid teeth, sparsely beset with long-stipitate whitish glands, red sessile glands, or both, sometimes long-ciliate, otherwise glabrous, or strigose on the nerves and margins, or more or less pubescent; staminate spike 5–15 mm. long, scarcely to conspicuously surpassing the bract; all valves of the capsules usually producing seed; seeds 1.3–2 mm. long.—Southern New Hampshire to Indiana and Wisconsin, south to Florida and Texas; apparently much more common southward. The following specimens are representative. NEW HAMPSHIRE: dry soil by roadside, Hampton Falls, Sept. 22, 1901, *E. F. Williams.* MASSACHUSETTS: damp, sandy soil, Bourne, Sept. 15, 1901, *Kennedy, Williams, & Fernald,* Pl. Exsicc. Grayanae, no. 7; sandy beach, No Bottom Pond, Brewster, Sept. 7, 1918, *Fernald & Long,* no. 17042 (N. E. B. C.); West Tisbury, Martha's Vineyard, Sept. 4, 1916, *Seymour,* no. 1257; dry, open field, Adams, Aug. 20, 1901, *M. A. Day,* no. 22. RHODE ISLAND: dry sands, Block Island, Sept. 14, 1913, *Fernald, Long & Torrey,* no. 9816. CONNECTICUT: dry field, Putnam, Sept. 5, 1909, *Bissell & Weatherby,* no. 2542. NEW JERSEY: dry woods, Mt. Arlington, Morris Co., Aug. 26, 1906, *Mackenzie,* no. 2348 (hb. Deam); in sand, Cold Spring, Aug. 30, 1917, *Gershoy,* no. 420. MARYLAND: Salisbury, Sept., 1865, *Canby.* VIRGINIA: sandy ballast of railroad, Poplar Springs, Aug. 8, 1921, *Grimes,* no. 4215; dry ground, region about Cape Charles, Aug. 27, 1923, *Tidestrom,* no. 11651; without locality, *Rugel.* NORTH CAROLINA: Dismal Swamp, South Mills, Sept. 1, 1893, *Boettcher;* dry soil, open scrub land near Kinston, Lenoir Co., July 9, 1922, *Randolph,* no. 562. FLORIDA: dry fertile fields, Duval Co., June, *Curtiss,* no. 3513; shady places, Myers, July-Aug., 1900, *Hitchcock,* no. 313; hammock, Orange Co., Aug. 8, 1902, *Fredholm,* no. 5474; along railroad, vicinity of Eustis, Lake Co., June 16–30, 1894, *Nash,* no. 1057. INDIANA: pasture near Kewanna, Fulton Co., Aug. 18, 1925, *Deam,* no. 42,162. WISCONSIN: without locality, Aug., 1881, *T. W. Parr,* no. 274. MISSISSIPPI: Cat Island, Aug. 26, 1900, *Tracy & Lloyd,* no. 279. LOUISIANA: without locality

Hale. Oklahoma: Sapulpa, Sept. 26, 1895, *Bush*, no. 1387 (N. Y.). Texas: woods near Handley, Nov. 16, 1912, *Ruth*, no. 336.

Dr. Gray cited no specimens in the original publication of *A. gracilens.* He undoubtedly included both the plant here taken as typical and var. *Fraseri.* Of the three specimens in the Gray Herbarium named by him (Virginia, *Rugel,* Mobile, *Bigelow,* and Louisiana, *Hale*) all of which may have been in his possession in 1848, two are the typical form and one the variety. Under these circumstances, Mueller's segregation of var. *Fraseri* should be taken as removing that element and the name kept for what is left.

A. gracilens is by far the most variable of the three species. Most New England specimens have the leaf-tissue glabrous, the pistillate bract beset with long-stalked whitish glands and long-ciliate, but otherwise glabrous, the staminate spikes short, and the seeds rather small, 1.3–1.6 mm. long. Further south the leaves are often more or less pubescent, the bract without stalked glands but with a few red sessile ones and often eciliate, but strigose on the nerves and margins or pubescent, the staminate spikes longer, and the seeds commonly larger, 1.6–2 mm. long. There would seem to be here the makings of two geographic varieties; but the characters are so thoroughly inconstant and combine in such a multiplicity of ways, that segregation appears to me impracticable. Should it ever be achieved, the name *A. gracilens* should go with the southern form, which is well represented by the Rugel specimen cited above (which might appropriately be designated as the type of the species) and less well by that of Bigelow.

The following varieties are more or less clearly distinguishable.

A. gracilens Gray, var. **Fraseri** (Muell. Arg.), n. comb. *A. virginica δ Fraseri* Muell. Arg. Linnaea xxxiv. 44 (1865).—Whole plant more densely and coarsely pubescent than in most specimens of the typical form; stem generally slender and sub-virgate, the branches few, lax, and weakly developed; primary leaves linear-lanceolate to linear, 3–5 cm. long, not over 1 cm. wide, on petioles usually about $\frac{1}{10}$ the length of the blade; staminate spikes greatly developed, 2–4 cm. long; pistillate bracts usually with red sessile glands but no stalked glands, if more than one, often distant on the lower part of the spike, not approximate near its base; two or three valves of the capsule producing seeds; seeds about 1.8 mm. long.—Georgia: dry hillside, Cobb Co., July 12, 1900, *Harper*, no. 28 in part (N. Y.; somewhat transitional). Illinois: Cobden, July 25, 1886, *F. S. Earle*, no. 1029. Alabama: without locality, *Buckley.* Arkansas: Little Rock, June 25, 1885, *Hasse* (N. Y.); without

locality, *Dr. Pitcher* (N. Y.). LOUISIANA: Covington, July 13, 1920, *Arsène*, no. 11728 (N. Y.); without locality, *Hale*. OKLAHOMA: Grand River, Cherokee Nation, Aug., 1895, *J. H. Kimmons*. TEXAS: sandy woods, Hempstead, 1872, *Hall*, no. 565; Texarkana, Aug. 29, 1898, *Heller*, no. 4164.

Var. *Fraseri* shows the same extreme, well-nigh teratological development of the staminate spike that was noted in the typical form of *A. digyneia*. In this case, however, it is correlated with narrow, somewhat elongate leaves, a more or less distinctive habit, and a tendency toward denser pubescence. The combination seems to have established itself as a genetic entity and to call for the taxonomic recognition accorded it by Mueller. Material from Biloxi, Miss. (*Tracy*, no. 4495, *Lloyd & Tracy*, no. 200 (N. Y.)) is transitional to the typical form. Torrey gave a manuscript name to specimens of this variety, which was used for a time by Gray in the herbarium, but appears later to have been abandoned by both in favor of *A. gracilens*.

A. GRACILENS Gray, var. MONOCOCCA Engelm. in Gray, Man. ed. 2. 390 (1856). *A. virginica β monococca* Wood, Class Book 630 (1861). *A. monococca* Engelm. ex Muell. Arg. Linnaea xxxiv. 45 (1865), as syn.—Whole plant densely pubescent with appressed-ascending incurved and straight hairs of various lengths; well-developed plants with numerous stiffly ascending or sub-fastigiate branches; leaves linear-lanceolate to linear, 2.5–3 cm. long, 5 mm. or less wide, the margins often revolute in drying, mostly on very short petioles; pistillate bracts pubescent and usually bristly-ciliate; staminate spikes 1 cm. or less long, not greatly exceeding the bracts; one valve only of the capsule maturing seed; seeds 1.8–2 mm. long.—MISSOURI: on the bank of the Mississippi, St. Louis, with *Aster oblongifolius*, *Solidago Drummondi*, etc., Sept. and Oct., 1844, *Engelmann* (isotype); barrens, Webb City, July 21, 1909, *E. J. Palmer*, no. 2523 (N. Y.). ARKANSAS: Sugarloaf Mt., *Bigelow* (N. Y.). KANSAS: open ground, Anderson Co., 1896, *Hitchcock*, no. 813. OKLAHOMA: field near Pawhuska, Osage Co., Aug. 11, 1913, *Stevens*, no. 2018; on the False Wichita between Ft. Cobb and Ft. Arbuckle, 1868, *Whipple Exped.* (N. Y.). TEXAS: gravel, College Station, July 5, 1900, *Reverchon*, no. 2160 (N. Y.). Also in southern Illinois, fide Gray, l. c.

Occasional capsules on a given plant, or even all the capsules of an individual of *A. gracilens* or var. *Fraseri* may mature only one seed. This character, like the great development of the staminate spike in var. *Fraseri*, might be regarded as accidental or teratological, but it correlates so generally in material from west of the Mississippi River with short, narrow leaves, dense and coarse pubescence, and sub-

fastigiate branching, that it can hardly be considered otherwise than as genetically established. Englemann's original collection, as represented at the Gray Herbarium, consists of small plants in which the bushy habit characteristic of most specimens does not appear. Mackenzie, no. 415 from Westport, Mo., Oct. 5, 1895, is transitional to var. *Fraseri*. It is barely possible that *A. fruticulosa* Raf. is referable to var. *monococca*, but one can only guess as to that.

Rafinesque described, in a somewhat hit-or-miss manner, eight North American species in this group. Five of them are disposed of, after some fashion, above. Of the others, one was taken from Robin; the descriptions of the other two read as if made up from a doubtful memory or from confused notes. Judging from the one specimen of Rafinesque's which I have seen, they may have been based on fragmentary and inadequate specimens. At any rate, they call for combinations of characters which do not exist in the material seen by me and, if they did, would render any taxonomic division of the group well-nigh hopeless. Unless authentic specimens should be found, the identity of *A. brevipes*, *A. divaricata*, and *A. fruticulosa* must remain a mystery.

GRAY HERBARIUM.

CONTRIBUTION TO THE FLORA OF THE ISLANDS OF ST. PIERRE ET MIQUELON.

BRO. LOUIS ARSÈNE.

(*Continued from p.* 191.)

PART III. GENERAL LIST OF ST. PIERRE ET MIQUELON PLANTS.

The following list is intended to represent, as far as possible, the whole flora, including introduced as well as indigenous plants growing in a wild state.

The names of introduced species are in italics. Discredited records are given with the indication of the species to which they have been transferred; they are enclosed in brackets. For each species, the sign × indicates in separate columns the names of those who reported it, or collected specimens: P. means De La Pylaie (Col. I); B., Beautemps-Beaupré (Col. II); G., Gautier (Col. III); D., Delamare (Col. IV); A., Bro. Louis Arsène (Col. V).

	P.	B.	G.	D.	A.
I. POLYPODIACEAE.					
1. Polypodium virginianum L.	..	..	..	..	×
["P. vulgare L."]	..	..	..	×	..
2. Pteridium latiusculum (Desv.) Hieron.	..	..	..	..	×
["Pteris aquilina L."]	×	×	×	×	..
3. Athyrium angustum (Willd.) Presl., var. rubellum (Gilbert) Butters	..	..	..	..	×
4. Thelypteris noveboracensis (L.) Nieuwl.	..	..	..	×	×
5. T. cristata (L.) Nieuwl.	..	..	..	×	×
6. T. spinulosa (O. F. Muell.) Nieuwl., var. americana (Fisch.) Weatherby	..	..	..	..	×
["Aspidium spinulosum (Muell.) Sw."]	..	×	×	×	..
7. T. hexagonoptera (Michx.) Weatherby	..	..	..	×	..
8. T. Phegopteris (L.) Slosson	..	..	×	×	×
9. Onoclea sensibilis L.	..	..	..	..	×
II. SCHIZAEACEAE.					
1. Schizaea pusilla Pursh	×	..	..	×	×
III. OSMUNDACEAE.					
1. Osmunda regalis L.	..	..	×	..	..
2. O. Claytoniana L	..	×	..	×	×
3. O. cinnamomea L.	×	×	×	×	×
IV. EQUISETACEAE.					
1. Equisetum arvense L	..	×	..	..	×
2. E. sylvaticum L., var. pauciramosum Milde	..	..	..	..	×
["E. sylvaticum L."]	×	×	..	×	..
3. E. littorale Kühlenwein	..	..	..	..	×
4. E. limosum L.	×	..	..	×	×
5. E. scirpoides Michx.	..	..	..	..	×
6. E. variegatum Schleich.	×	..	..	..	×
V. LYCOPODIACEAE.					
1. Lycopodium Selago L.	×	×	×	..	×
2. L. lucidulum Michx.	..	..	..	..	×
3. L. inundatum L.	..	..	×	×	×
4. L. obscurum L.	×	..	..	×	×
5. L. annotinum L.	×	..	..	×	×
6. L. annotinum L., var. pungens Desv.	..	..	..	..	×
7. L. sabinaefolium Willd., var. sitchense Fernald	..	..	..	..	×
8. L. clavatum L., var. brevispicatum Peck	..	..	..	..	×
["L. clavatum L."]	×	..	..	×	..

	P.	B.	G.	D.	A.
9. L. complanatum L., var. flabelliforme Fernald	..	..	..	..	×
["L. complanatum L."]	×	..	..	×	..
10. L. alpinum L.	..	..	×	..	..

VI. TAXACEAE.

	P.	B.	G.	D.	A.
1. Taxus canadensis Marsh	×	..	..	..	×

VII. PINACEAE.

	P.	B.	G.	D.	A.
1. Pinus Strobus L.	..	..	..	..	×
2. Larix laricina (Du Roi) Koch.	..	..	..	×	×
3. Picea canadensis (Mill.) B.S.P.	×	..	×	×	×
4. P. rubra (Du Roi) Dietr.	..	..	..	..	×
5. P. mariana (Mill.) B.S.P.	×	..	×	×	×
6. Abies balsamea (L.) Mill., var. phanerolepis Fernald	..	..	..	..	×
["A. balsamea (L.) Mill."]	..	..	×	×	..
7. Juniperus communis L., var. montana Ait.	..	..	..	..	×
["J. communis L."]	..	..	×	×	..
8. J. horizontalis Moench	..	..	..	..	×
["J. Sabina L."]	..	..	×	..	..
["J. virginiana L."]	×	..	..	×	..

VIII. SPARGANIACEAE.

	P.	B.	G.	D.	A.
1. Sparganium angustifolium Michx	..	..	..	..	×
["S. natans L."]	..	..	..	×	..
2. S. americanum Nuttall	×	..	×	..	..

IX. NAIADACEAE.

	P.	B.	G.	D.	A.
1. Potamogeton polygonifolius Pourret	..	..	..	..	×
["P. natans L."]	×	..	×	×	..
2. P. epihydrus Raf.	..	..	..	..	×
["P. plantagineus Du Croz," for No. 2 ? or No. 4?]	..	..	×	..	..
3. P. bupleuroides Fernald	..	..	..	..	×
["P. perfoliatus L."]	..	..	..	×	..
4. P. heterophyllus Schreb.	×	..	..	..	×
5. Ruppia maritima L., var. obliqua (Schur) Asch. & Graebn.	..	..	..	..	×
["R. rostellata Koch."]	×	..	..	..	..
6. Zostera marina L., var. angustifolia Hornem.	..	..	..	..	×

X. JUNCAGINACEAE.

	P.	B.	G.	D.	A.
1. Triglochin maritima L.	×	..	..	×	×

XI. GRAMINEAE.

		P.	B.	G.	D.	A.
1.	*Echinochloa Crus-Galli* (L.) Beauv	..	..	..	..	×
2.	*Setaria lutescens* (Weigel) Hubbard	..	..	..	..	×
3.	*Anthoxanthum odoratum* L.	×	..	×	×	×
4.	Hierochloe odorata (L.) Wahl	..	..	..	..	×
5.	H. alpina (Sw.) R. & S.	..	..	..	..	×
6.	*Phleum pratense* L.	×	×	×	×	×
7.	P. alpinum L.	×	..	..	..	..
8.	Alopecurus geniculatus L.	..	..	×	..	×
9.	*A. pratensis* L.	×	..	..	..	×
10.	*Agrostis vulgaris* With	×	..	..	..	×
11.	*A. alba* L.	..	..	..	×	×
12.	A. alba L., var. maritima (Lam.) G.F.W. Meyer	..	..	..	..	×
13.	Calamagrostis Pickeringii Gray, var. debilis (Kearney) Fern. & Wieg.	..	..	..	..	×
14.	C. canadensis Beauv., var. robusta Vasey	..	..	..	..	×
15.	Ammophila breviligulata Fernald	..	..	..	..	×
	["A. arenaria Link."]	×	..	..	×	..
16.	Cinna latifolia (Trev.) Griseb	..	..	..	..	×
17.	*Holcus lanatus* L.	×	..	..	..	×
18.	Deschampsia flexuosa (L.) Trin.	×	..	..	..	×
19.	D. caespitosa (L.) Beauv	×	..	..	..	×
20.	*Avena sativa* L.	..	..	..	..	×
21.	*Arrhenatherum elatius* (L.) Beauv.	..	..	..	×	..
22.	Danthonia spicata (L.) Beauv	..	..	..	..	×
23.	Spartina Michauxiana Hitch	..	..	..	..	×
	["S. cynosuroides Willd."]	×	..	..	..	..
24.	*Cynodon Dactylon* L.	..	..	..	×	×
25.	*Dactylis glomerata* L.	..	..	×	×	×
26.	*Cynosurus cristatus* L.	×	..	..	..	×
27.	*Poa annua* L.	..	..	..	..	×
28.	P. laxa Haenke	..	×	..	..	..
29.	P. pratensis L.	..	..	..	×	×
30.	*P. trivialis* L.	..	..	×	..	..
31.	Glyceria canadensis (Michx.) Trin.	..	..	..	×	×
32.	G. nervata (Willd.) Trin.	..	..	..	..	×
33.	G. borealis (Nash) Batchelder	..	..	..	..	×
34.	Festuca rubra L., var. oraria Dumort	..	..	..	..	×
35.	*F. elatior* L.	..	..	×	×	×
36.	*Bromus hordeaceus* L.	..	..	×	×	×
37.	B. ciliatus L., var. denudatus (Wieg.) Fern.	..	..	..	..	×
	[B. canadensis Michx. (?)]	..	..	×	×	..
38.	*Lolium perenne* L.	..	..	×	×	×
39.	Agropyron repens (L.) Beauv	..	..	..	×	×

	P.	B.	G.	D.	A.
40. Elymus arenarius L., var. villosus E. Mey. (E. mollis Trin.)	×	×	..	×	×

XII. CYPERACEAE.

	P.	B.	G.	D.	A.
1. Eleocharis palustris (L.) R. & S.	×	..	..	×	×
2. Scirpus pauciflorus Lightf.	..	..	..	×	×
3. S. caespitosus L., var. callosus Bigelow	..	..	..	..	×
["S. caespitosus L."]	×	×	..	×	..
4. S. hudsonianus (Michx.) Fern. (Eriophorum alpinum L.)	×	..	×	..	×
5. S. subterminalis Torr.	..	..	..	..	×
6. S. americanus Pers.	..	..	..	..	×
7. S. rubrotinctus Fernald.	..	..	..	..	×
["S. atrovirens Muhl."]	..	×	..	×	..
8. Eriophorum spissum Fernald	..	..	..	..	×
["E. vaginatum L."]	×	×	×	×	..
9. E. spissum Fern., var. erubescens Fern.	..	..	..	..	×
["E. russeolum Fr."]	×	×	..	×	..
10. E. angustifolium Roth.	×	..	×	×	×
11. E. angustifolium Roth., var. majus Schultz.	..	..	..	..	×
["E. latifolium Hoppe."]	..	..	..	×	..
12. E. virginicum L.	..	..	..	×	×
13. Rhynchospora alba (L.) Wahl.	..	..	..	×	×
14. Carex exilis Dewey	..	..	..	..	×
15. C. canescens L.	..	..	..	..	×
16. C. canescens L., var. disjuncta Fernald	..	..	..	..	×
17. C. remota L.	..	..	..	×	..
18. C. brunnescens (Pers.) Poir., var. sphaerostachya (Tuckerm.) Kükenth.	..	..	..	..	×
19. C. trisperma Dewey	..	..	..	..	×
20. C. muricata L., var. cephalantha (Bailey) Wieg. & Eames	..	..	..	..	×
21. C. vulpinoidea Michx.	..	×	..	..	×
22. C. stipata Muhl.	..	..	..	..	×
23. C. maritima O. F. Müller	..	..	..	..	×
24. C. salina Wahl., var. kattegatensis (Fries) Almq.	..	..	..	..	×
25. C. crinita Lam.	..	×	..	..	×
26. C. gynandra Schwein	..	..	..	..	×
27. C. aquatilis Wahl.	..	..	..	..	×
28. C. Goodenovii J. Gay.	..	..	..	×	×
29. C. Goodenovii J. Gay, var. strictiformis (Bailey) Kükenthal.	..	..	..	..	×
30. C. Haydeni Dewey	..	..	..	..	×
["C. aperta Boott."]	..	..	..	×	..
31. C. pauciflora Lightf.	..	..	..	×	×

	P.	B.	G.	D.	A.
32. C. leptalea Wahl	..	..	..	..	×
33. C. Buxbaumii Wahl	..	..	..	..	×
34. C. gracillima Schw	..	..	..	..	×
35. C. scirpoidea Michx	..	..	..	..	×
36. C. deflexa Hornem	..	..	..	..	×
37. C. novae-angliae Schwein	..	..	..	..	×
38. C. livida Willd., var. Grayana (Dewey) Fernald	..	..	..	..	×
39. C. panicea L	..	..	..	×	..
40. C. pallescens L	..	..	..	..	×
41. C. paupercula Michx	..	..	..	..	×
42. C. limosa L	..	..	..	×	×
43. Carex rariflora (Wahlenb.) J. E. Smith	..	..	..	..	×
44. C. pedunculata Muhl	..	..	..	..	×
45. C. conoidea Schk	..	..	..	..	×
46. C. lepidocarpa Tausch	..	..	..	..	×
47. C. Œderi Retz	..	..	..	×	×
48. C. debilis Michx., var. Rudgei Bailey	..	..	..	..	×
49. C. oligosperma Michx	..	..	..	..	×
50. C. intumescens Rudge	..	×	..	..	×
51. C. folliculata L	..	..	..	×	×
52. C. Michauxiana Boeckl	..	..	..	..	×
53. C. Hostiana DC., var. laurentiana Fern. & Wieg	..	..	..	..	×
54. C. rostrata Stokes	..	..	..	..	×
55. C. rostrata Stokes, var. utriculata (Boott) Bailey	..	..	..	..	×

XIII. LEMNACEAE.

	P.	B.	G.	D.	A.
1. Lemna minor L	×	..	..	..	×

XIV. ERIOCAULACEAE.

	P.	B.	G.	D.	A.
1. Eriocaulon septangulare With	×	..	×	×	×

XV. JUNCACEAE.

	P.	B.	G.	D.	A.
1. Juncus bufonius L	..	..	..	×	×
2. J. trifidus L	..	..	×	..	..
3. J. balticus Willd., var. littoralis Engelm	..	..	..	..	×
["J. balticus Willd."]	..	×	×	×	..
4. J. filiformis L	..	..	..	×	×
5. J. glaucus Ehrh	..	..	..	×	..
6. J. effusus L., var. conglomeratus (L.) Engelm	..	..	..	..	×
[J. conglomeratus L.]	..	..	×	×	..
7. J. effusus L., var. solutus Fern. & Wieg	..	..	..	..	×

	P.	B.	G.	D.	A.
8. J. effusus L., var. Pylaei (Laharpe) Fern. & Wieg.	..	..	×	..	..
9. J. canadensis J. Gay	..	..	×	..	..
10. J. bulbosus L.	..	..	..	..	×
["J. Tenageia Ehrh."]	..	..	..	×	..
11. Juncus articulatus L., var. obtusatus Engelm	..	..	..	×	×
12. J. stygius L., var. americanus Buchen.	..	..	..	..	×
13. J. biglumis L.	..	..	×	..	..
14. Luzula saltuensis Fernald	..	..	..	..	×
["L. pilosa DC."]	..	..	..	×	..
15. L. campestris (L.) DC., var. acadiensis Fernald	..	..	..	..	×
16. L. campestris (L.) DC., var. congesta (Thuill.) Meyer	..	..	..	×	×
["L. campestris (L.) DC."]	..	×	×	..	..
17. L. campestris (L.) DC., var. multiflora (Ehrh.) Celak	..	..	..	×	×
18. L. parviflora (Ehrh.) Desv., var. melanocarpa (Michx.) Buchenau	..	..	×	×	×

XVI. LILIACEAE.

	P.	B.	G.	D.	A.
1. Tofieldia glutinosa (Michx.) Pers.	..	..	..	×	×
2. Clintonia borealis (Ait.) Raf	×	..	×	×	×
3. Smilacina stellata (L.) Desf.	×	..	×	×	×
4. S. trifolia (L.) Desf.	..	×	×	×	×
5. Maianthemum canadense Desf	×	..	×	×	×
6. Streptopus amplexifolius (L.) DC.	×	..	..	×	×
7. S. roseus Michx	..	..	..	×	×

XVII. IRIDACEAE.

	P.	B.	G.	D.	A.
1. Iris versicolor L.	×	..	×	×	×
2. I. setosa Pall., var. canadensis Foster	..	..	..	..	×
3. Sisyrinchium angustifolium Miller	..	..	..	..	×
["S. anceps L."]	×	..	..	×	..
["S. bermudiana L."]	..	..	×	..	..

XVIII. ORCHIDACEAE.

	P.	B.	G.	D.	A.
1. Cypripedium acaule Ait.	×	×	..	×	×
2. Cypripedium hirsutum Mill.	..	..	×	..	..
3. Habenaria hyperborea (L.) R. Br.	×	..	×	×	×
4. H. dilatata (Pursh) Gray	×	..	×	..	×
5. H. clavellata (Michx.) Spreng.	×	..	..	..	×
6. Habenaria obtusata (Pursh) Richards	..	..	..	..	×
7. H. Hookeri Torrey	..	..	..	..	×
8. H. orbiculata (Pursh) Torrey	..	..	..	×	×
9. H. blephariglottis (Willd.) Torr.	..	..	..	×	×

	P.	B.	G.	D.	A.
10. H. lacera (Michx.) R. Br	×	..	×	×	×
11. H. lacera (Michx.) R. Br., var. terrae-novae Fernald	..	..	..	..	×
12. H. psycodes (L.) Sw	..	..	..	..	×
13. H. fimbriata (Ait.) R. Br	..	..	×	×	×
14. Pogonia ophioglossoides (L.) Ker	×	..	×	×	×
15. Calopogon pulchellus (Sw.) R. Br	..	..	..	×	×
16. Arethusa bulbosa L	×	..	×	×	×
17. Spiranthes Romanzoffiana Cham	..	..	..	..	×
18. S. cernua (L.) Richards	×	..	×	×	..
19. Epipactis repens (L.) Crantz, var. ophioides (Fernald) Eaton	..	..	..	..	×
["E. repens (L.) Crantz."]	..	..	×	..	..
20. Listera cordata (L.) R. Br	..	..	..	..	×
21. L. convallarioides (Sw.) Torr	..	..	..	..	×
22. Corallorhiza maculata Raf	..	..	..	..	×
23. C. trifida Chatelain	..	..	..	..	×
24. Malaxis unifolia Michx	..	..	..	×	×

XIX. SALICACEAE.

	P.	B.	G.	D.	A.
1. Salix lucida Muhl	..	..	..	..	×
2. S. pedicellaris Pursh	..	..	..	..	×
3. S. Uva-ursi Pursh	×	..	..	..	×
4. Populus tremuloides Michx	..	..	..	..	×
5. P. tacamahacca Mill	..	..	..	..	×

XX. MYRICACEAE.

	P.	B.	G.	D.	A.
1. Myrica Gale L	..	×	×	×	×
2. M. carolinensis L	..	..	..	..	×
["M. cerifera L."]	×	..	..	..	..

XXI. BETULACEAE.

	P.	B.	G.	D.	A.
1. Corylus rostrata Ait	..	..	×	×	×
2. Betula lutea Michx. f	..	..	..	..	×
3. B. papyrifera Marsh	×	..	..	..	×
["B. pubescens Ehrh."]	..	..	×	..	..
4. B. papyrifera Marsh., var. cordifolia (Regel) Fern	..	..	..	..	×
5. B. pumila L	×	..	..	×	×
6. B. Michauxii Spach	×	..	..	..	..
["B. nana L."]	..	..	×	..	..
7. Alnus crispa (Ait.) Pursh., var. mollis Fernald	..	..	..	..	×
["A. viridis DC."]	×	..	×	×	..
8. A. incana (L.) Moench	..	..	..	..	×

	P.	B.	G.	D.	A.
XXII. URTICAEAE.					
1. *Urtica dioica* L.	×	..	×	×	×
2. *U. urens* L.	×	..	×	×	×
3. Laportea canadensis (L.) Gaud.	×	..	..	..	×
XXIII. POLYGONACEAE					
1. *Rumex Patientia* L.	×	..	..	..	×
2. *R. crispus* L.	×	..	×	×	×
3. R. mexicanus Meisn.	..	..	..	..	×
["R. salicifolius Weinm."]	×	..	..	..	..
4. *R. obtusifolius* L.	×	..	..	×	×
5. *R. Acetosa* L.	..	..	..	×	×
6. R. Acetosella L.	×	..	×	×	×
7. Polygonum Raii Bab.	..	..	..	..	×
8. *P. aviculare* L.	×	..	×	×	×
9. P. viviparum L.	×	..	..	×	×
10. *P. lapathifolium* L.	×	..	..	..	..
11. P. natans (Michx.) Eaton	..	..	..	..	×
["P. amphibium L., var. natans Moench."]	..	..	..	×	..
12. P. natans, forma Hartwrightii (A. Gray) Stanford	..	..	..	..	×
13. Polygonum Hydropiper L.	..	..	×	..	×
14. *P. Persicaria* L.	×	..	..	..	×
15. P. sagittatum L.	..	..	×	..	×
16. *P. Convolvulus* L.	×	..	..	×	×
XXIV. CHENOPODIACEAE.					
1. Chenopodium rubrum L.	..	..	..	×	×
2. *C. album* L.	..	..	..	..	×
3. *C. opulifolium* Schrader	×	..	..	×	..
4. *Atriplex patula* L.	..	..	..	..	×
["A. latifolia Wahl."]	..	..	..	×	..
5. *A. patula* L., var. *hastata* (L.) A. Gray	..	..	..	..	×
[A. hastata L.]	×	..	..	×	..
6. A. glabriuscula Edmonston	..	..	..	..	×
7. Salsola Kali L.	..	..	..	..	×
XXV. CARYOPHYLLACEAE.					
1. Spergularia salina J. & C. Presl.	×	..	..	..	×
2. S. media (L.) Presl (for S. canadensis?)	×	..	..	..	..
3. *Spergula arvensis* L.	..	..	..	..	×
4. Sagina procumbens L.	×	×	×	×	×
5. S. nodosa (L.) Fenzl.	..	..	×	..	×
6. Arenaria lateriflora L.	×	..	..	..	×
7. A. peploides L., var. robusta Fernald	..	..	..	..	×
["A. peploides L."]	×	..	..	..	..

	P.	B.	G.	D.	A.
8. Stellaria borealis Bigel	×	..	..	..	×
9. S. uliginosa Murray	×	..	..	..	×
10. S. longifolia Muhl	×	..	..	..	×
11. *S. graminea* L.	..	..	..	..	×
12. *S. media* (L.) Pursh	×	..	×	..	×
13. *S. aquatica* (L.) Scop	..	..	×	..	..
14. *Cerastium vulgatum* L.	..	..	×	×	×
15. *Cerastium viscosum* L.	×	..	..	..	×
16. Silene acaulis L., var. exscapa (All.) DC	..	..	..	..	×
["S. acaulis L."]	..	..	..	×	..

XXVI. PORTULACACEAE.

	P.	B.	G.	D.	A.
1. Montia lamprosperma Cham.	..	..	..	..	×
["M. fontana L."]	×	..	..	..	..

XXVII. NYMPHAEACEAE.

	P.	B.	G.	D.	A.
1. Nymphozanthus variegatus (Engelm.) Fernald	..	..	..	..	×
["Nymphaea advena Ait."]	×	..	..	×	..
["Nuphar luteum Sm."]	..	..	×	..	..

XXVIII. RANUNCULACEAE.

	P.	B.	G.	D.	A.
1. Ranunculus Cymbalaria Pursh	×	..	×	×	×
2. R. Flammula L,	..	..	×	..	×
3. R. reptans L., var. filiformis (Michx.) Hook	×	..	×	×	×
4. R. sceleratus L.	×	..	..	..	×
5. R. repens L.	..	..	×	..	×
6. *R. acris* L.	×	..	×	×	×
7. Thalictrum dioicum L.	×	..	..	..	×
8. T. polygamum Muhl.	..	×	×	×	×
9. Coptis trifolia (L.) Salisb.	×	..	×	×	×

XXIX. FUMARIACEAE.

	P.	B.	G.	D.	A.
1. *Fumaria officinalis* L.	..	..	..	..	×

XXX. CRUCIFERAE.

	P.	B.	G.	D.	A.
1. *Thlaspi arvense* L.	×	..	..	..	×
2. Cochlearia cyclocarpa Blake	..	..	..	..	×
["C. anglica L."]	..	..	×	..	..
["C. officinalis L."]	×	..	..	×	..
3. C. danica L. (?)	..	..	×	..	..
4. *Capsella Bursa-pastoris* (L.) Medic	×	..	×	×	×
5. Cakile edentula (Bigel.) Hooker.	×	..	..	..	×
["C. maritima DC."]	..	..	..	×	..
6. *Raphanus Raphanistrum L.*	..	..	..	..	×
7. *Brassica arvensis* (L.) Ktze	..	..	..	..	×

	P.	B.	G.	D.	A.
8. *B. nigra* (L.) Koch	..	..	..	..	×
9. *Sisymbrium officinale* (L.) Scop	..	..	..	..	×
10. *Barbarea vulgaris* R. Br.	×	..	..	..	×
11. *B. verna* (Mill.) Aschers	×	..	..	..	×
12. Cardamine pensylvanica Muhl	..	..	..	..	×
XXXI. SARRACENIACEAE.					
1. Sarracenia purpurea L.	×	..	×	×	×
XXXII. DROSERACEAE.					
1. Drosera rotundifolia L.	×	..	×	×	×
2. D. intermedia Hayne	×	..	×	×	×
XXXIII. CRASSULACEAE.					
1. Sedum roseum (L.) Scop.	..	..	..	×	×
XXXIV. SAXIFRAGACEAE.					
1. Mitella nuda L.	..	..	..	..	×
2. Ribes hirtellum Michx	..	..	..	..	×
["R. oxyacanthoides L."].	×	..	..	×	..
3. *R. Grossularia* L.	..	..	×	×	×
4. *R. nigrum* L.	..	..	..	×	×
5. R. prostratum L'Hér.	×	..	..	×	×
6. *R. rubrum* L.	..	..	×	×	×
XXXV. ROSACEAE.					
1. Spiraea latifolia (Ait.) Bork., var. septentrionalis Fernald	..	..	..	..	×
["S. salicifolia L."]	×	..	..	×	..
["S. corymbosa Raf."]	..	..	×	..	..
2. *Pyrus Malus* L.	..	..	..	×	×
3. P. arbutifolia L. f., var. atropurpurea (Britt.) Robins.	..	..	..	..	×
["P. arbutifolia L. f."]	×	..	×	..	..
["P. melanocarpa (Michx.) Willd.," for No. 3 (or No. 7? Gautier)]	..	..	×	×	..
4. Pyrus dumosa (Greene) Fernald.	..	..	..	..	×
["P. americana (Marsh.) DC."]	×	×	×	×	..
5. × P. Arsenii (Britton) Arsène (P. dumosa × arbutifolia, var. atropurpurea)	..	..	..	..	×
6. Amelanchier laevis Wiegand	..	..	..	..	×
7. A. Bartramiana (Tausch.) Roem	..	..	..	..	×
[A. canadensis Torr., var. oligocarpa Torr.]	×	..	..	×	..
8. Fragaria virginiana Duchesne, var. terrae-novae (Rydb.) Fernald & Wiegand	..	..	..	..	×
["F. virginiana Duch."]	..	..	..	×	..

	P.	B.	G.	D.	A.
9. Potentilla norvegica L., var. hirsuta (Michx.) Lehm	×	..	..	..	×
10. P. palustris (L.) Scop.	×	..	×	×	×
11. P. fruticosa L	×	..	×	×	×
12. P. tridentata Ait	×	..	×	×	×
13. P. Anserina L.	..	..	×	×	×
14. Geum macrophyllum Willd.	..	..	..	..	×
15. G. rivale L.	..	..	..	×	×
16. Rubus idaeus L., var. canadensis Richards	..	..	..	..	×
["R. idaeus L."]	..	..	×	×	..
["R. strigosus Michx."?]	×	..	..	..	..
17. R. Chamaemorus L.	×	..	×	×	×
18. R. pubescens Raf. (R. triflorus Richards)	×	..	×	×	×
19. R. arcticus L.	×	..	..	×	×
20. R. acaulis Michx	..	..	×	×	×
21. R. recurvicaulis Blanchard	..	..	..	..	×
["R. canadensis L." ?]	×	..	..	×	..
22. Alchemilla alpina L.	..	..	..	..	×
23. Sanguisorba canadensis L.	×	..	×	×	×
24. Rosa nitida Willd.	×	..	..	×	×
["R. pimpinellifolia L." ?]	..	..	×	..	..
25. R. carolina L. (R. humilis Marsh.)	×	..	..	..	×
26. Prunus virginiana L.	..	..	..	..	×
["P. serotina Ehrh."]	..	..	..	×	..
27. P. pennsylvanica L. f.	×	..	..	×	×

XXXVI. LEGUMINOSAE.

	P.	B.	G.	D.	A.
1. *Trifolium pratense* L.	×	..	..	×	×
2. T. repens L.	×	..	..	×	×
3. *T. hybridum* L.	..	..	..	..	×
4. *Vicia sativa* L	×	..	..	..	×
5. *V. angustifolia* Roth, var. *segetalis* (Thuill.) Koch	..	..	..	..	×
6. *V. tetrasperma* (L.) Moench.	×	..	..	..	×
7. *V. hirsuta* (L.) Koch	..	..	..	..	×
8. Lathyrus maritimus (L.) Bigel.	×	..	×	×	×
9. L. palustris L., var. pilosus (Cham.) Ledeb.	..	..	..	..	×
["L. palustris L."]	×	..	..	×	..
10. L. palustris L., var. retusus Fern. & St. John	..	..	..	..	×

XXXVII. OXALIDACEAE.

	P.	B.	G.	D.	A.
1. Oxalis montana Raf.	..	..	..	..	×

XXXVIII. GERANIACEAE.

	P.	B.	G.	D.	A.
1. Geranium Robertianum L.	×	..	×	..	×

	P.	B.	G.	D.	A.
XXXIX. EUPHORBIACEAE.					
1. *Euphorbia Helioscopia* L.	..	..	..	..	×
2. *E. Peplus* L.	..	..	×	×	×
XL. CALLITRICHACEAE.					
1. Callitriche palustris L.	×	..	..	..	×
XLI. EMPETRACEAE.					
1. Empetrum nigrum L.	×	..	×	×	×
2. E. Eamesii Fernald & Wieg.	..	..	..	..	×
["E. rubrum Vahl."]	..	..	×	×	..
XLII. AQUIFOLIACEAE.					
1. Ilex verticillata (L.) Gray, var. tenuifolia Wats.	..	..	..	..	×
["Prinos verticillatus L."]	×	..	..	..	..
2. Nemopanthus mucronata (L.) Trelease	×	..	..	..	×
XLIII. ACERACEAE.					
1. Acer spicatum Lam.	×	..	..	..	×
XLIV. BALSAMINACEAE.					
1. Impatiens biflora Walt.	..	..	..	..	×
XLV. HYPERICACEAE.					
1. Hypericum canadense L.	..	..	..	..	×
2. H. virginicum L.	×	..	..	×	×
XLVI. CISTACEAE.					
1. Hudsonia ericoides L.	..	..	..	..	×
["H. tomentosa Nutt."]	×	..	×?	×	..
XLVII. VIOLACEAE.					
1. Viola cucullata Ait.	×	..	..	×	×
2. V. palustris L.	..	..	×	..	..
3. V. pallens (Banks) Brainerd	..	..	..	..	×
["V. blanda Willd."]	×	..	..	×	..
4. V. labradorica Schrank.	..	..	..	..	×
["V. Muhlenbergii Torr."]	×	..	..	×	..
["V. canina L."]	..	..	×	..	..
5. *V. tricolor* L.	×	..	×	×	×
6. *V. arvensis* L.	..	..	..	×	×
XLVIII. ONAGRACEAE.					
1. Epilobium angustifolium L., var. macrophyllum Fernald	..	..	..	..	×
["E. spicatum Lam."]	..	..	×	×	..

	P.	B.	G.	D.	A.
2. E. palustre L.	×	..	×	×	×
3. E. palustre L., var. monticola Hausskn.	..	..	..	..	×
4. E. glandulosum Lehm	..	..	..	..	×
["E. tetragonum L."]	..	..	×	×	..
5. E. alpinum L.	..	..	×	..	..
6. Œnothera muricata L.	..	..	..	..	×
["O. biennis L."]	×	..	..	..	..
7. O. pumila L.	..	..	..	..	×
8. Circaea alpina L.	×	..	×	..	×

XLIX. HALORAGIDACEAE.

	P.	B.	G.	D.	A.
1. Myriophyllum alterniflorum DC.	..	..	..	×	×
2. M. spicatum L.	..	..	..	×	..
3. M. verticillatum L., var. pectinatum Wallr.	..	..	..	×	×
4. M. tenellum Bigel	×	..	..	..	×
5. Hippuris vulgaris L.	×	..	..	×	×

L. ARALIACEAE.

	P.	B.	G.	D.	A.
1. Aralia nudicaulis L.	..	..	..	×	×

LI. UMBELLIFERAE.

	P.	B.	G.	D.	A.
1. Sanicula marylandica L., var. borealis Fernald	..	..	..	..	×
2. Ligusticum scothicum L.	×	..	×	×	×
3. *Æthusa Cynapium* L.	..	..	×	..	×
4. Coelopleurum lucidum (L.) Fernald	..	..	..	..	×
[Archangelica Gmelini DC.]	×	..	×	×	..
5. *Pastinaca sativa* L.	×	..	..	..	×
6. Heracleum lanatum Michx	×	..	..	×	×
7. *Imperatoria Ostruthium* L.	..	..	×	..	..
8. Conioselinum chinense (L.) B.S.P.	..	..	..	×	×

LII. CORNACEAE.

	P.	B.	G.	D.	A.
1. Cornus canadensis L.	×	..	×	×	×
2. C. suecica L.	×	×	×	×	×
3. C. stolonifera Michx	..	..	..	×	×
4. C. alternifolia L. f.	..	..	..	..	×

LIII. ERICACEAE.

	P.	B.	G.	D.	A.
1. Moneses uniflora (L.) A. Gray	×	..	..	×	×
2. Pyrola minor L.	×	×	..	..	×
3. P. secunda L.	×	..	..	×	×
4. P. chlorantha Sw	..	..	×	..	..
5. P. rotundifolia L., var. arenaria Mert. & Koch	..	..	..	..	×
6. Monotropa uniflora L.	..	..	×	..	×
7. Ledum groenlandicum Œder	×	×	×	×	×

	P.	B.	G.	D.	A.
8. Rhododendron canadense (L.) B.S.P.	..	..	..	×	×
9. Loiseleuria procumbens (L.) Desv.	..	..	×	×	×
10. Kalmia angustifolia L.	×	×	×	×	×
11. Kalmia polifolia Wang.	..	..	×	×	×
12. Andromeda glaucophylla Link.	..	..	..	..	×
["A. polifolia L."]	×	..	×	×	..
13. Chamaedaphne calyculata (L.) Moench.	×	×	..	×	×
14. Epigaea repens L.	..	..	..	..	×
15. Gaultheria procumbens L.	×	..	×	×	×
16. Arctostaphylos Uva-ursi (L.) Spreng.	×	..	×	..	×
17. A. alpina (L.) Spreng.	×	..	×	×	×
18. Chiogenes hispidula (L.) T. & Gr.	×	..	×	×	×
19. Gaylussaccia dumosa (Andr.) T. & Gr., var. Bigeloviana Fernald	..	..	..	..	×
["G. dumosa, var. hirtella Gray"]	×	..	×?	..	..
20. G. baccata (Wang.) C. Koch.	×	..	×	..	×
21. Vaccinium pensylvanicum Lam., var. angustifolium (Ait.) Gray	..	..	..	×	×
["V. pensylvanicum Lam."]	×	×	..	..	..
["V. Myrtillus L."]	..	..	×	..	..
22. V. corymbosum L.	..	..	×	..	..
23. V. uliginosum L., var. alpinum Bigel.	..	..	..	..	×
["V. uliginosum L."]	×	..	×	×	..
24. V. Vitis-Idaea L., var. minus Lodd.	..	..	..	..	×
["V. Vitis-Idaea L."]	×	..	×	×	..
25. V. Oxycoccos L.	×	×	×	×	×
26. V. macrocarpon Ait.	×	..	×	×	×

LIV. DIAPENSIACEAE.

	P.	B.	G.	D.	A.
1. Diapensia lapponica L.	..	..	×	×	×

LV. PRIMULACEAE.

	P.	B.	G.	D.	A.
1. Primula veris L.	..	..	..	..	×
2. Lysimachia terrestris (L.) B.S.P.	×	..	..	×	×
3. Trientalis borealis Raf. (T. americana Pursh)	×	×	×	×	×
4. *Anagallis arvensis* L.	..	..	..	×	×
5. A. tenella L.	..	..	×	×	..

LVI. GENTIANACEAE.

	P.	B.	G.	D.	A.
1. Gentiana detonsa Rottb., for G. nesophila Holm?	..	..	×	..	..
2. Halenia deflexa Griseb.	×	..	×	×	×
3. Bartonia virginica (L.) B. S.P.	..	..	..	..	×
["B. verna Muhl."]	×	..	..	..	..
4. Menyanthes trifoliata L.	×	..	×	×	×

	P.	B.	G.	D.	A.
LVII. CONVOLVULACEAE.					
1. Convolvulus sepium L., var. pubescens (Gray) Fernald	..	..	..	..	×
["C. sepium, var. americanus Sims."]	×	..	..	..	..
LVIII. BORAGINACEAE.					
1. *Borago officinalis* L.	..	..	×	×	×
2. Myosotis arvensis Lam.	..	..	..	..	×
3. Mertensia maritima (L.) S. F. Gray	×	×	×	×	×
LIX. LABIATAE.					
1. Scutellaria epilobiifolia A. Hamilt	..	..	..	..	×
["S. galericulata L."]	×	×	×	..	..
2. *Glecoma hederacea* L.	..	..	..	..	×
3. Prunella vulgaris L., var. lanceolata (Barton) Fern.	..	..	..	..	×
["P. vulgaris L."]	..	..	×	×	..
4. *Galeopsis Ladanum* L.	..	..	×	×	×
5. *G. Tetrahit* L.	×	..	×	..	×
6. *Lamium amplexicaule* L.	..	..	..	×	×
7. *L. hybridum* Vill	×	..	×	..	×
8. *L. purpureum* L.	..	..	..	×	×
9. *Satureja hortensis* L.	..	..	..	×	×
10. Lycopus uniflorus Michx., var. ovatus Fern. & St. John	..	..	..	..	×
["L. virginicus L."]	×	..	×	×	..
11. *Mentha piperita* L.	..	..	..	×	×
12. M. arvensis L.	..	..	..	..	×
13. M. arvensis L., var. canadensis (L.) Briq.	..	..	..	..	×
["M. canadensis L., var. glabrata Benth." ?]	×	..	..	..	..
LX. SCROPHULARIACEAE.					
1. Chelone glabra L.	..	..	..	×	×
2. Veronica scutellata L.	..	..	..	..	×
3. V. officinalis L.	..	..	..	..	×
4. V. serpyllifolia L.	..	..	..	..	×
5. *V. arvensis* L.	..	..	..	..	×
6. *V. agrestis* L.	..	..	..	..	×
7. Melampyrum lineare Lam.	..	..	..	..	×
8. Euphrasia americana Wettst.	..	..	..	..	×
["E. officinalis L."]	×	..	×	×	..
9. Rhinanthus Crista-Galli L.	×	..	×	×	×
LXI. LENTIBULARIACEAE.					
1. Utricularia vulgaris L., var. americana Gray	..	..	..	..	×
["U. vulgaris L."]	..	..	×	..	..

	P.	B.	G.	D.	A.
2. U. minor L	..	..	..	..	×
3. U. intermedia Hayne	×	×	..	×	×
4. U. cornuta Michx.	×	..	×	×	×
5. Pinguicula vulgaris L	×	..	×	×	×
LXII. OROBANCHACEAE.					
1. Orobanche terrae-novae Fernald	..	..	..	..	×
LXIII. PLANTAGINACEAE.					
1. *Plantago major* L.	×	..	×	×	×
2. *P. lanceolata* L	..	..	×	×	×
3. P. juncoides Lam., var. decipiens (Barnéoud) Fernald	..	..	..	..	×
["P. maritima L."]	×	×	×	×	..
LXIV. RUBIACEAE.					
1. Galium palustre L.	..	..	..	..	×
["G. uliginosum L."]	..	..	×	..	..
2. G. trifidum L	×	..	..	..	..
3. G. Claytoni Michx.	..	..	..	..	×
4. G. labradoricum Wiegand	..	..	..	..	×
5. G. triflorum Michx	×	..	..	..	×
6. Mitchella repens L.	×	..	..	×	×
7. Houstonia Faxonorum (Pease & Moore) Fernald	..	..	..	..	×
LXV. CAPRIFOLIACEAE.					
1. Diervilla Lonicera Mill	×	..	..	×	×
2. Lonicera villosa (Michx.) Roem. & Schultes	..	..	..	..	×
["L. caerulea L."]	×	..	..	..	..
["L. caerulea canadensis Lam."]	..	..	..	×	..
[L. velutina DC.]	..	..	×	..	..
3. L. villosa Roem. & Sch., var. calvescens (Fern. & Wieg.) Fernald	..	..	..	..	×
["L. villosa Muhl."]	..	..	×	..	..
4. Linnaea americana Forbes	..	..	..	..	×
["L. borealis L."]	..	×	×	×	..
5. Viburnum cassinoides L	×	..	×	×	×
LXVI. CAMPANULACEAE.					
1. Campanula rotundifolia L	×	..	..	×	×
["C. pusilla"]	..	..	×	..	..
LXVII. LOBELIACEAE.					
1. Lobelia Dortmanna L.	×	..	×	×	×
LXVIII. COMPOSITAE.					
1. Solidago macrophylla Pursh.	..	..	..	..	×
["S. squarrosa Muhl."]	×	..	..	×	..

	P.	B.	G.	D.	A.
2. S. uniligulata (DC.) Porter	..	..	..	..	×
["S. terrae-novae T. & G."]	×	..	..	×	..
["S. canadensis L." for No. 2?]	..	..	×	..	..
3. S. rugosa Mill., var. villosa (Pursh) Fernald	..	..	..	..	×
4. *Bellis perennis* L.	..	..	..	×	×
5. Aster radula Ait., var. strictus (Pursh) Gray	×	..	×	×	×
6. A. umbellatus Mill	..	..	..	..	×
["A. umbellatus, var. latifolius Gray."]	×	..	..	×	..
7. A. nemoralis Ait	×	..	..	×	×
["A. tripolium L."??]	..	..	×	..	..
8. Erigeron canadensis L.	..	..	×	..	×
9. Anaphalis margaritacea (L.) Benth. & Hook., var. subalpina Gray	..	..	..	..	×
["A. margaritacea B. & H."]	×	..	..	..	..
10. Gnaphalium uliginosum L.	×	..	..	..	×
11. Achillea borealis Bong.	..	..	..	..	×
12. *A. Millefolium* L.	×	..	×	×	×
13. *Matricaria inodora* L.	×	..	..	..	×
14. *Chrysanthemum Leucanthemum* L.	×	..	..	×	×
15. *Tanacetum vulgare* L.	..	..	..	×	×
16. Artemisia borealis L.	..	..	×	..	..
17. *A. Absinthium* L.	..	..	..	×	×
18. *Senecio vulgaris* L.	×	..	×	..	×
19. S. Pseudo-Arnica Less.	×	..	×	×	×
20. *Carduus nutans* L.	..	..	×	..	×
21. Cirsium muticum Michx.	×	..	..	×	×
22. *C. arvense* (L.) Scop.	×	..	..	..	×
23. *Centaurea nigra* L.	..	..	..	..	×
24. *Cichorium Intybus* L.	..	..	..	..	×
25. *Hypochaeris radicata* L.	..	..	×	..	×
26. *Leontodon autumnalis* L.	×	..	..	×	×
27. *Taraxacum officinale* Weber	×	..	×	×	×
28. *Sonchus asper* (L.) Hill	×	..	..	..	×
29. *S. oleraceus* L.	×	..	×	..	×
30. *S. arvensis* L.	..	..	×	..	×
31. Prenanthes trifoliolata (Cass.) Fernald	..	..	..	..	×
["P. alba L."]	×	..	..	×	..
["Nabalus serpentarius DC."]	..	..	×	..	..
32. Hieracium canadense Michx.	×	..	..	×	×
Total number of species reported	215	38	181	246	454

Highlands, Jersey,
Channel Islands.

Xyris montana in eastern Massachusetts.—In the *Reports on the Flora of the Boston District,*—VI,[1] only three species of *Xyris* are listed, no mention of *X. montana* Ries being made. In a recent study of the genus, however, I have found an old specimen of most characteristic *X. montana* collected in August, 1882 at Wilmington, Massachusetts by the late C. E. Perkins. This specimen came to the herbarium of the New England Botanical Club with the herbarium of Mr. Warren H. Manning and was without specific name, thus indicating doubt as to its identity. It has the distinctive characters of the northernmost member of the genus: the very narrow leaves, small lance-ovoid head, with uniformly brown narrow bracts erose-ciliolate at summit, but it is in too poor condition to show the *exserted* tips of the lateral sepals which in thoroughly satisfactory material further distinguish *X. montana* from *X. caroliniana* Walt.

On June 14 last Mr. Lyman B. Smith and I renewed the search for the lost *Carex Hostiana* DC., var. *laurentiana* Fern. & Wieg.[2] (*C. Hornschuchiana,* var. *laurentiana* Fern. & Wieg.; *C. fulvescens* Mackenzie), a characteristic plant of Newfoundland and Anticosti, which had been collected nearly a century ago by Benjamin D. Greene with *C. limosa* "in pond at Tewksy."[3] Since the only known station for *C. limosa* in Middlesex County is in the quaking boggy margin of Long Pond in Tewksbury we naturally went there. In the sixteen years since Mr. F. F. Forbes and I made a similar search at Long Pond the bog has followed the course of most such bogs of southern New England: the quagmire has been rapidly overcome by the dense thicket of *Chamaedaphne calyculata, Myrica Gale* and other dominating shrubs and the lower *Andromeda glaucophylla, Kalmia polifolia, Vaccinium Oxycoccus, Carex exilis* and especially *C. limosa* are fast being choked out. At one part of the bog *C. limosa* still holds possession of a particularly wet opening, along with *C. exilis* and *Drosera longifolia* and here was an abundance of *Xyris montana,* thus making an association thoroughly typical of the wet bog-barrens of Newfoundland, a setting quite fitting for *C. Hostiana,* var. *laurentiana.* But, just as in June, 1911, the search for the latter plant was a disappointment. It is, however, of interest to record this definite station for *Xyris montana,* since the exact location of the Wilmington station

[1] Rhodora, xii. 6 (1910).
[2] Rhodora, xxvi. 122 (1924).
[3] See Fernald, Rhodora, xiii. 246 (1911).

is unknown. A visit later in the season may yet reveal the evasive *Carex*.—M. L. FERNALD, Gray Herbarium.

TETRAMERISM IN TRILLIUM UNDULATUM.—Last May in the course of a walk in the rain in Salisbury, Connecticut, Mrs. Weatherby and I ran across three plants of painted trillium in which all the parts (leaves, sepals, petals, stigmas and cells of the ovary) were in fours except the stamens. These had increased in their usual proportion of two to each petal and numbered eight. The plants were of average size and vigor, all parts were perfectly and symmetrically developed, and all the stamens and stigmas appeared to be functioning normally. In the Gray Herbarium is a specimen of a precisely similar plant collected at Fitzwilliam, New Hampshire by Miss K. L. Kimball in May, 1891.

The genus *Trillium* is rather noted for its tendency to develop eccentric forms. A good many such have been reported (as for instance by Deane, RHODORA x. 21–24 and 214–216 and xii. 63, and Goodspeed, Univ. California Pub. vii. 69–100). One line of teratological variation which crops out in several species, is in the number of parts of the foliar and floral whorls. Cases in which an abnormal number is carried consistently through all the whorls appear, however, to be rare. One completely tetramerous plant of *Trillium grandiflorum* has been reported by Victorin (Nat. Canadien xl. 113) and one of *T. sessile* by Eastwood (Erythrea iv. 71): but there appears to be no published account of such a form in *T. undulatum*. The present note is put forth by way of completing the record.

It may be added that there is in the herbarium of the New England Botanical Club a specimen of *T. undulatum* with a withered flower, collected by Fernald at Houlton, Maine, June 27, 1899, in which the leaves and sepals and so far as can be made out from the fragments of them which remain, the petals are in fives.—C. A. WEATHERBY, Gray Herbarium.

AXYRIS AMARANTOIDES IN EASTERN AMERICA.—For some years the Russian and Siberian annual, *Axyris amarantoides* L., has been naturalized as a weed in Manitoba and North Dakota and it has spread thence southward to Missouri (May, 1918, *Bush*, no. 8308) and westward to Alberta (July, 1922, *Brinkman*, no. 752). It is not

yet a general weed in eastern America, but its recent collection at three distinct eastern points indicates that it is making its way to us. On July 24, 1921, Mrs. Eleanor M. Mead sent to the Gray Herbarium a specimen of it, collected as a strange weed at North Bridgton, Maine; the next day (July 25, 1921) Messrs. Bartram, Long and I found a single plant of it by a roadside at Windsor, Nova Scotia; and on August 28, 1926, Messrs. Long, Fogg and I, while lingering on shore during the stop at Gaspé, Gaspé Co., Quebec, of the Newfoundland steamer, found the same strange weed in profusion in rubbish on the beach. It is thus clear that *Axyris* is finding eastern America. The plant is easily recognized: although belonging in the *Chenopodiaceae* it strongly suggests an Amaranth, or perhaps *Mercurialis annua L.*, in its dry texture; while its little staminate spikes raised high above the pistillate give it a unique appearance.—M. L. Fernald, Gray Herbarium.

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LEIOPHYLLUM VERSUS DENDRIUM

M. L. Fernald

The small Ericaceous shrubs of eastern America long known as *Leiophyllum* have recently appeared in works emanating from the New York Botanical Garden[1] under the name *Dendrium* Desv. The bibliographic explanation given is

"DENDRIUM Desv. Journ. Bot. (II.) **1**: 36. 1813.

[Leiophyllum Pers. Syn. **1**: 477. 1805. Not Ehrh. 1780.]"

From this statement it would look as if there were a generic name, *Leiophyllum* Pers. (1805), which is antedated by a properly published generic name *Leiophyllum* Ehrh. (1780); and, therefore, by the American code Ehrhart's use of the name would seem to make it invalid for later use as a generic name. Examination of the name *Leiophyllum* Ehrh. shows, however, that this is not the case; for Ehrhart's name is not a generic name nor does it have any status in scientific nomenclature. *Leiophyllum* Ehrh. was No. 11 of his "nomina usualia" or monomials published in his *Index Phytophylacii Ehrhartiani*.[2] These names, as has been so clearly reëmphasized by Dr. John Hendley Barnhart,[3] were "not . . . of very much consequence, since they are nothing but an attempt to assign to each plant a name that may be used for it alone, without an accompanying generic one;" or, as Dr. Barnhart renders the words of Oeder, from

[1] Britton & Brown, Ill. Fl. ii. 562 (1897); Small, Fl. Se. U. S. 882 (1903); Small, N. A. Fl. xxix. 38 (1914); etc.

[2] Ehrh. Beitr. iv. 145–150 (1789).

[3] Barnhart, *The so-called Generic Names of Ehrhart's Phytophylacium*, Rhodora, xxii. 180–182 (1920).

whom Ehrhart took his cue, they are names "for common non-botanical conversational use, . . . having no connection or relation to classification, to genus, or to specific relationship, but one for each species, relating to itself alone." Such names are not generic names and have no more status in scientific nomenclature than "Smooth Menziesia" or "Mountain Eubotrys." Again to quote Barnhart's just condemnation of their recognition in botanical nomenclature: "How inexcusable, then, is it for any one to assume that these were generic names without even reading what Ehrhart himself has to say about them." Surely the trivial and wholly unscientific use of *Leiophyllum* by Ehrhart in 1789 (not 1780 as stated by Britton & Brown and by Small)[1] in no wise invalidates the properly published but later generic name *Leiophyllum* for the Ericaceous shrubs.

The valid generic name *Leiophyllum*, however, should not be ascribed to Persoon (1805) as is commonly done; for Persoon, Syn. i. 477 (1805), did not treat it as a genus, but merely as a section of *Ledum*, a fact clearly recognized in Pfeiffer's Nomenclator. As a genus *Leiophyllum* was first published by Hedwig (filius) in 1806, as cited by Pfeiffer, the Index Kewensis and Dalla Torre & Harms. The generic bibliography is as follows:

LEIOPHYLLUM (Pers.) Hedw. fil. Gen. 313 (1806). *Ammyrsine* Pursh, Fl. Am. Sept. 301 (1814). *Dendrium* Desv. Journ. de Bot. iii. (or Sér. 2: i.) 36 (1814). *Fischera* Swartz, Mém. Soc. Nat. Mosc. v. 14 (1817).

The citation for *Dendrium* given by Britton & Brown (and very similarly by Small) is "Desv. Journ. Bot. (II.) **1**:36. 1813." Desvaux first issued, with title-page dates 1808 and 1809 respectively, two volumes of "JOURNAL DE BOTANIQUE, rédigé par une Société de Botanistes," with only the two volumes. After an interval he renewed the series as "Journal de Botanique, appliqué à l'agriculture, à la pharmacie, à la medécine et aux arts." The first of this 2nd series in the library of the Gray Herbarium bears a preliminary title-page "Journal de Botanique. Seconde Année. Tome 3e," followed by the more detailed title-page without volume-number and with the date 1813. The next volume, also dated 1813, bears no volume-number, the imprint at the bottom of the first page giving the date

[1] I can find no evidence except the citations by Britton & Brown and by Small that Ehrhart used the name in 1780. He certainly used it as a monomial in 1789; and the latter date only is given by Pfeiffer, the Index Kewensis and Dalla Torre & Harms.

Juillet 1813. The next volume, with the date 1814, bears, like the first of the new series, the title-page number Tome III and the last volume, also dated 1814, is called Tome IV. The dates of issue given on the title-pages appear to be untrustworthy. Thus, opposite the main title-page of the last of the whole series there appears the "Avis. *Nous avons publié, en 1810, deux Volumes de 384 pages chacun et de 12 gravures, intitulés simplements* Journal de Botanique, rédigé par une Societé de Botanistes." The date, now given as 1810, materially differs from the dates 1808 and 1809 given on the title-pages of these volumes but helps to explain the statement in the following volume: "Seconde Année." Vol. iii. or Sér. 2: i. is dated 1813 and the date Février 1813 appears at the bottoms of pages 49, 65 and 81; Mars 1813 at the bottoms of pages 97, 113 and 129; etc. Nevertheless, European bibliographers apparently have recent information (its source as yet unknown to me) that the part of vol. iii. or Sér. 2: i. containing *Dendrium* (p. 36) and *Loiseleuria* (p. 35) was not issued until 1814. At least, although the first fascicle of Index Kewensis (1893) gives *Dendrium* as published in 1813, in the third fascicle (1894) it appears in the synonymy of *Leiophyllum* as published in 1814; and on a succeeding page *Loiseleuria* is dated as published in 1814. Similarly, Dalla Torre & Harms, whose bibliography is usually accurate, date these two names from 1814. In view of the unfortunate confusion in much of Desvaux's work[1] and his obvious bibliographic carelessness in numbering the volumes of his Journal de Botanique, Alphonse De Candolle's statement in regard to Desvaux's herbarium is illuminating: "Les omissions ou indications fausses de pays et la similitude de certains echantillons avec ceux du Muséum rendent cet herbier fort curieux."—A. DC. Phytogr. 408 (1880).

Gray Herbarium.

NOTES FROM THE HERBARIUM OF THE UNIVERSITY OF WISCONSIN—I.

Norman C. Fassett

Juniperus horizontalis Moench. Almost confined, in Wisconsin, to the shores of Lake Michigan. Known elsewhere in the state only

[1] For example, see Rhodora, xvi. 27, 28 (1914).

from DANE Co.: dry crumbling sandstone bluffs, Primrose, *Fassett* 2719 (U, G, N).[1]

SPARGANIUM ANDROCLADUM (Engelm.) Morong; Fernald, RHODORA xxxiv. 28 (1922). COLUMBIA Co.: edge of pool bordering Sphagnum bog, Gibraltar Rock, Lodi, *Fassett* 2889 (U, G, N). Identified by Mr. C. A. Weatherby. A considerable extension of range (see Fernald, *l. c.*).

POTAMOGETON BUPLEUROIDES Fernald. VILAS Co.: Star Lake, *Denniston & Timberlake* 384 (U.) ONEIDA Co.: Rainbow Rapids, *Cheney* 1416 (U); Nigger Island, Tomahawk, *Cheney* 2097 (U). PORTAGE Co.: Stevens Point, *Cheney* 3461 & 3576 (U).

These collections are all from the northern part of the valley of the Wisconsin River. Here, in Vilas County, and in the adjacent counties of Michigan, the watersheds of the Mississippi and the St. Lawrence River systems meet in a land of lakes. See Peattie, RHODORA xxiv. 86 (1922) regarding the inland distribution of this species.

ZIZANIA AQUATICA L.; Fassett, RHODORA xxvi. 156 (1924). The typical form of this species was reported (*l. c.*) as occurring westward to Michigan. Its known range may be extended into Wisconsin as follows: WINNEBAGO Co.: Omro, *Benke* (M.) SAUK Co.: Ferry Bluffs, *Smith* 8146 (U, M). DANE Co.; Madison, *Hale* (U). WAUKESHA Co.: Muskego, *Brah* (M). MILWAUKEE Co.: Milwaukee, *Bruhin* 1192 (M), and *Runge* 1191 (M). WALWORTH Co.: Troy, *Almon* (U).

Z. AQUATICA, var. ANGUSTIFOLIA Hitchc. This variety, also, is found to occur in Wisconsin, beyond the range assigned to it in the writer's earlier paper. ASHLAND Co.: Kakagin River [east of Ashland], *Cheney* 4904 (U). VILAS Co.: Rice Lake, near Boulder Junction, *Smith* 8312 (M). BURNETT Co.: Danbury, *Baird* (U). PRICE Co.: Phillips, *Goessl* 2329 (M). LINCOLN Co.: Merrill, *Goessl* 2783 (M). WAUPACA Co.: New London, *Goessl* 6446 (M). BROWN Co.: Duck Creek, *Goessl* 5536 (M). TREMPEALEAU Co.: Arcadia, *Davis* (U). WASHINGTON Co.: Cedar Lake, *Graenicher* (M). RACINE Co.: Horlickville [Racine], *Wadmond* (W). The last-cited specimen approaches var. *interior*.

A specimen of this variety from Andover, Massachusetts, *Wetmore* (U) is the second the writer has seen from that state.

[1] The locations of specimens cited are indicated as follows:
U—Herbarium of the University of Wisconsin, Madison, Wisconsin.
M—Milwaukee Public Museum, Milwaukee, Wisconsin.
G—Gray Herbarium, Cambridge, Massachusetts.
N—New York Botanical Garden, New York City.
R—Herbarium of Mr. W. A. Matthews, Rochester, New York.
W—Herbarium of Mr. S. C. Wadmond, Delavan, Wisconsin.
I—Herbarium of Cornell University, Ithaca, New York.
A—New York State Museum, Albany, New York.

Professor Wiegand[1] has recently treated this variety as a species, under the name *Z. palustris* L., not Hitchc., Contrib. U. S. Nat. Herb. xii, Pt. 3: 124 (1908) and in Gray, Manual, ed. 7., stating that in New York it is distinct from *Z. aquatica.* This is doubtless true; the present writer is familiar with these two phases of wild rice in Maine, where they are certainly distinct. But they are not distinct in Wisconsin, where *Z. aquatica* and its varieties *angustifolia* and *interior* intergrade.

Z. AQUATICA, var. INTERIOR Fassett, *l. c.* This variety is probably more common in Wisconsin than available herbarium sheets would indicate, for the writer has seen it growing abundantly along the Mississippi River from Lake Pepin to Fountain City, and has observed from the train, probably in Monroe County, numerous large stands of what must be this variety. Herbarium sheets are as follows: DANE CO.: University Bay, Madison, *Heddle* 1387 (U) and *Cheney* (U). MILWAUKEE CO.: Milwaukee, *Lapham* (U). The last-named sheet approaches this variety in its smooth, although somewhat papery, pistillate lemmas.

The distribution, then, of the varieties of wild rice in Wisconsin may be seen to be similar, on a small scale, to the distribution of the varieties of wild rice in their larger ranges. Typical *Z. aquatica* is found in southeastern Wisconsin, and ranges from there eastward and southward on the Atlantic coast. Variety *angustifolia* occupies the northern part of the state, and from Wisconsin is found eastward to New Brunswick, its range being generally more northern than that of the typical variety. Variety *interior* is apparently most abundant on the western borders of the state, and is found from there westward.

MUHLENBERGIA RICHARDSONIS (Trin.) Rydb. There is a single specimen of this species in the University Herbarium, collected by J. Wolf and labelled "Ill." According to Dr. J. J. Davis, Wolf lived in western Illinois, but collected much in the West. Since this species is not definitely known from Illinois, the possibility of incorrect labelling must be considered.

DESCHAMPSIA CESPITOSA (L.) Beauv., var. GENUINA Gren. & Godr.; Fernald, RHODORA xxvii. 153 (1926). MILWAUKEE CO.: Milwaukee, *Lapham* (U). PIERCE CO.: Prescott, *Lapham* [specimen over-mature; probably this variety] (U).

D. CESPITOSA, var. GLAUCA (Hartm.) Lindm.; Fernald *l. c.* ASHLAND CO.: Madeline Island, *Cheney* 5718 (U). DOUGLAS CO.: Wisconsin Point in Old Superior, *Cheney* 7638 (U). BROWN CO.: woods near the shore, Big Suamico, *Schuette* (U).

[1] Mem. Cornell Agric, Exper. Sta. lxlii. 83 (1926).

Eleocharis interstincta (Vahl.) R. & S. Dane Co.: Dead Lake [Lake Wingra], Madison, *True* (U). See Peattie, Rhodora xxiv. 86 (1922) regarding the inland distribution of this species.

E. quadrangulata (Michx.) R. & S. Kenosha Co.: Powers Lake [Randall Tp.], *Davis* (U). Reported from "Ct. to Mich., and southw." in Gray's Manual, ed. 7. See Peattie, *l. c.*

E. ovata (Roth) R. & S. Oneida Co.: Rainbow Rapids, *Cheney* 1405 (U). Compare with Wisconsin range of *Potamogeton bupleuroides.* Reported from "N. B. to Ct. and Mich.; Ore." in Gray's Manual, ed. 7.

E. Englemanni Steud., var. detonsa Gray. Iowa Co.: Arena, *Davis* (U).

Scirpus Clintonii Gray. Brown Co.: Green Bay, *Scheutte* (U). Monroe Co.: Melvina, *Davis* (U). Iowa Co.: Avoca, *Davis* (U). Dane Co.: Vermont, *Cheney* (U). Reported in Gray's Manual, ed. 7, from "N. B. to w. N. Y. and Mich.; 'N. C.'"

Sc. rubrotinctus Fernald, var. confertus Fernald. Douglas Co.: Solon Springs, *Allen* (U).

Sc. atrovirens Muhl., f. sychnocephalus (Cowles) Blake. Dane Co.: Eagle Heights, Madison, *Baird* (U). Milwaukee Co.: Whitefish Bay, *Brues* (M).

Sc. atrovirens, var. georgianus (Harper) Fernald. Iowa Co.: Arena, *Fassett* (U). Reported from "Que. to Mich., Ga., and Ark." in Gray's Manual, ed. 7.

Sc. cyperinus (L.) Kunth, var. pelius Fernald. Common, apparently, throughout the state. In the swamps about Madison it is as frequent as it is in Massachusetts; along the wastern border of the state, on the Mississippi River bottoms below Lake Pepin, it is largely replaced by *Sc. pedicellatus,* but even in this region, and in eastern Minnesota, occasional clumps may be found. Reported in Gray's Manual ed. 7, from "Nfd. to Ont., s. to Ct., N. Y., and Mich."

Juncus balticus Willd., var. littoralis Engelm. Frequent along the shores of Lakes Michigan and Superior, but known elsewhere in Wisconsin only as follows: Dane Co.: sandy shore of Crystal Lake, Roxbury, *Fassett* 2790 (U, G, R); shore of Lake Wingra, Madison, *Fassett* 2774 (U, G, N, R). Racine Co.: Gatliff, *Wadmond* 923 (W).[1]

J. balticus, var. littoralis, f. dissitiflorus Engelm. Not common. Door Co.: North Bay, *Russel* (M). Matinowoc Co.: Two Rivers, *Kumlien* (M). Milwaukee Co.: Milwaukee, *Sylvester* (M).

Erythronium americanum Ker, var. Bachii Farwell. Manitowoc Co.: Two Rivers, *Heald* (U).

Maianthemum canadense Desf. In Wisconsin, as in Minnesota,[2] this species is of northern range, while its variety *interius* is more southern. The following are the stations south of latitude 44°, where it is uncommon and localized. The writer, in watching for

[1] Trans. Wis. Acad. Sci., Arts and Letters xvi. 819 (1909).

[2] Butters, Rhodora xxviii. 9–11(1926).

the glabrous phase, has observed that when occurring in southern Wisconsin it is usually to be found in cool woods and on mossy bluffs, rather than in the deciduous forest, although it may rarely be found in the latter habitat. CALUMET Co.: Brillion, *Benke* (M). SHEBOYGAN Co.: [without locality] *Kremers* (U). ADAMS Co.: Coldwater Canyon, The Dells, Dell Prairie, *Fassett* 2768 (U, G, N, R). SAUK Co.: Baraboo, *True* (U); Baxter's Hollow, Baraboo Hills, *Smith* 8206 (U, M); damp mossy bluffs, Parfrey's Glen, Merrimac, *Fassett* 2742 (U, G, N, R). DANE Co.: cool woods, Lutheran Hill, Roxbury, *Fassett* 2793 (U, G, N, R); oak woods, Montrose, *Fassett* 3539 (U). IOWA Co.: damp mossy cliff, Barneveld, *Fassett* 2779 (U, G, N, R).

M. CANADENSE, var. INTERIUS Fernald. Collections north of latitude 44° are as follows: ASHLAND Co.: on Long Island, *Cheney* 5314 (U). ONEIDA Co.: Rhinelander, *Goessl* 581 (M). MARINETTE Co.: Marinette, *Goessl* 4152 (M). SHAWANO Co.: Keshena, *Smith* 6450 (M). DOOR Co.: Ellison Bay, *Goessl* 3868 (M); woods on the flats, Egg Harbor, *Brunken* (M); Sturgeon Bay, *Goessl* 3733 (M). PIERCE Co.: River Falls, *Weinzirl* (U). JACKSON Co.: Hixton, *Davis* (U).

SPERGULA ARVENSIS L. This weed has apparently not yet spread to southern Wisconsin, being represented only by sheets from the northern counties. But the Portage Co. specimen recorded below was collected in 1894, and a collection from Lincoln Co. is dated 1893, so this species is by no means a newcomer in the state. SAWYER Co.: Radisson, *Davis* (U). PRICE Co.: occasional, waste places, Jugerville, *Escoll* 490 (M). LINCOLN Co.: Gilbert Falls, Tomahawk, *Cheney* 2245 (U); sandy ground, very common, Merrill, *Goessl* 772 (M). ONEIDA Co.: Rhinelander, *Goessl* 2625 (M). MARATHON Co.: sandy open ground, quite common, Edgar, *Goessl* 979 (M). PORTAGE Co.: Webster, *Cheney* 3428 (U).

STELLARIA GRAMINEA L. Apparently rare. VILAS Co.: Boulder Junction, *Carlson* (U).

RADICULA SYLVESTRIS (L.) Drude. Apparently a newcomer in Wisconsin. Dates of collection are included in the following citations: DANE Co.: Madison, 1916, *Denniston* (U); Black Earth, 1921, *Davis & McFarland* (U). IOWA Co.: Arena, 1922 and 1923, *Davis* (U). GRANT Co.: Blue River, 1926, *Davis* (U). ROCK Co.: Edgerton, 1922 and 1923, *Davis* (U). MILWAUKEE Co.: Story's Woods, Wauwatosa, 1912, *Monroe* (M).

AMELACHIER FLORIDA Lindley. ADAMS Co.: wooded roadside, The Dells, Dell Prairie, Fassett 2823 (U, G, I) *fide* Professor Wiegand. SAUK Co.: Devils Lake, *Cheney* (U). IOWA Co.: Hollandale, *Davis* (U). These stations are all in the unglaciated area of Wisconsin.

A. BARTRAMIANA (Tausch) Roemer. Confined, in Wisconsin, to the shore of Lake Superior. Not reported from this state by Wiegand.[1] ASHLAND Co.: La Pointe to Big Bay, Madeline Island, *Cheney* 5649

[1] RHODORA xiv. 117–161 (1912).

(U); Outer Island, *Jackson & Sheldon* 202 (U); Long Island, *Cheney* 5351 (U).

Cassia marilandica L. Reported in Gray's Manual, ed. 7, as growing in "Alluvial sand, N. E. to O., Tenn., and N. C." Discovered by Dr. J. J. Davis on alluvial soil along the lower Wisconsin River, its tributary the Blue River, and on the Sugar River at Brodhead. The Sugar River is a tributary of the Rock River, which enters the Mississippi at Rock Island, Illinois; its valley is separated from the Blue River and Wisconsin River valleys by Military Ridge, which is in the unglaciated area, and preglacial in origin (see relief map accompanying Martin, Physical Geography of Wisconsin (1915)). Iowa Co.: Arena, *Davis* (U); Avoca, *Gilbert & Davis* (U). Grant Co.: Blue River bottoms, Blue River *Davis* (U). Green Co.: Brodhead, *Davis* (U). Dane Co.: [without locality; both the Sugar and the Wisconsin Rivers enter this county], *Spears* (U).

Ceanothus ovatus Desf., var. pubescens T. & G. Reported in Gray's Manual from "Ia. and southwestw." Burnett Co.: Nemakagon River [without collector's name] (M). Eau Claire Co.: rocky woods, fairly common, Eau Claire, *Goessl* 1751 (M). Portage Co.: Linwood Ferry, *Cheney* 3572 & 3561 (U). Jackson Co.: Millston, *Davis* (U). Columbia Co.: Kilbourn, *Wadmond* (W). Iowa Co.: Blue Mounds, *Lapham* (U). Rock Co.: Beloit, *Lapham* (U).

Viola Selkirkii Pursh. Douglas Co.: St. Louis River opposite Fond du Lac [Minn.], *Cheney* 7846 (U); Herbster, *Cheney* 6853 (U). Oconto Co.: [without locality] *Plumb* (U). Clark Co.: Neillsville, *Hammond* (U). Sauk Co.: Devils Lake, *Fassett* 2807 (U, G, A).

At Devils Lake, 72 miles from the nearest known station to the northward, and over 200 miles from Lake Superior, this violet grew at the foot of a talus slope over 500 feet high. Here the ground is shaded by a heavy forest growth and cooled by air currents blowing, doubtless, from snow persisting beneath the talus.

Opuntia Rafinesquii Engelm. Sauk Co.: narrows of the Baraboo River, Garrisonville,[1] *Lapham* [?] (U); Sumpter, *Ward* (M); Sand Prairie, 4 mi. west of Prarie du Sac, *Smith* 8283 (U, M); Leland, *Addoms & Albert* (U, G); Baraboo, *Hale* (U); Spring Green, *Davis* (U). Columbia Co.: Sugar Loaf, across the Prairie du Sac bridge, *Smith* 8037 (U, M). Grant Co.: Muscoda, *Davis* (U). Dane Co.: Wisconsin River near Mazomanie, *Ward* (M); Primrose, *Fassett* 3100 (U, G, N).

This species, like *Cassia marilandica* (*q. v.*) appears to be confined in this state to the lower Wisconsin River valley, and the valley of the Sugar River.

[1] A note on this sheet by J. R. Heddle reads, "Garrison *was* a 'paper' village." It is not shown on the 1924 Rand McNally map of Wisconsin.

Rhexia virginica L. Marquette Co.: [without locality] *Townley* (U). Iowa Co.: Arena, *Davis* (U).

Dodecatheon Meadia L., var. Frenchii Vasey. Range cited in Gray's Manual, ed. 7, as from "Pa. to Ill. and Ark." Crawford Co.: [without locality] *Schumann* (U). Milwaukee Co.: Milwaukee, *Lapham* (U).

Convolvulus sepium L., var. pubescens (Gray) Fernald. Dane Co.: Madison, *Hale* (U). See Peattie, Rhodora xxiv. 88 (1922).

Diodia teres Walt. Iowa Co.: sand plain, Arena, *Fassett* 2615 (U).

Anaphalis margaritacea (L.) B. & H., var. occidentalis Greene. See Fernald, Mem. Am. Acad. Arts and Sci. xv. 284 (1926). Douglas Co.: Brule River, *Cheney* 7493 (U). Bayfield Co.: between Port Wing and Orienta, *Cheney* 7345 (U); Drummond, *Cheney* 4072 (U). Ashland Co.: Madeline Island, *Toole* 33 (U). Vilas Co.: Lac Vieux Desert, *Cheney* 408-C (U). Oneida Co.: Pelican Lake, *Kremers* (U). Sawyer Co.: Hayward, *Gilbert & Gilbert* (U). Brown Co.: Green Bay, *Hale* (U).

Bidens discoidea (T. & G.) Britton. Barron Co.: Chetek, *Davis* (U). Lincoln Co.: Tomahawk, *Davis* (U). Oconto Co.: Oconto, *Davis* (U). Shawano Co.: Shawano, *Davis* (U); Cecil, *Davis* (U). Eau Claire Co.: very common, Eau Claire, *Goessl* 1770 (M). Buffalo Co.: rocky shore of Mississippi River, Alma, *Fassett* 2881 (U, G); wet bank, Cochrane, *Fassett* 2877 (U). Also collected in Minnesota: Wabasha Co.: boggy pond-margin, Weaver, *Fassett & Hotchkiss* 2880 (U, G, N); floating dock, Minneiska, *Fassett* 2876 (U, G, N, R). Winona Co.: floating dock, Winona, *Fassett* 2878 (U, G, N).

Range cited in Gray's Manual, ed. 7, as from "Mass. to Mich., Ill., southw. and southwestw." See also Peattie, *l. c.*

B. connata Muhl., var. anomala Farwell. Langlade Co.: White Lake, *Davis* (U).

Centaurea maculosa Lam. Vilas Co.: Wilson Lake, *Milwaukee Science Club* (M). Iowa Co.: Arena, *Fassett* 2626 (U).

Hieracium aurantiacum L. This species is becoming abundant in Wisconsin, particularly in the northern part of the state (see also *Spergula arvensis* and *Stellaria graminea*). It is not, however, a newcomer, having been collected as long ago as 1885; a gap from then until 1905 would suggest the possibility of recent reintroduction. In the following citations the year of collection is included. Bayfield Co.: Herbster, 1919, *Sheldon* 10 (U). Oneida Co.: Pelican Lake, 1914, *Kremers* (U); Tomahawk Lake, 1926, *Cooper* (U, G). Taylor Co.: roadsides and clearings, in dense colonies, Rib Lake, 1915, *Goessl* 3052 (M). Marathon Co.: open ground, very common, Edgar, 1915, *Goessl* 867 (M). Clark Co.: not common, Neillsville, 1915, *Goessl* 1443 (M), open ground in large colonies, Trow, 1915,

Goessl 1336 (M). Door Co.: Sturgeon Bay, 1905, [coll.?] (M); Newport, 1906, *Ward* (M). Waupaca Co.: common, Wegauwega, 1885, Trelease [?] (U). Manitowoc Co: Two Rivers, 1917, *Davis* (U). Jackson Co.: Black River Falls, 1922, *Smith* 6961 (U, M); Hixton, 1916, *Davis* (U); Black River Falls, 1916, *Davis* (U). Adams Co:. Adams, 1917, *Davis* (U). Sauk Co.: Baraboo Bluffs, 1922, *Smith* 7924 (U, M). Dodge Co.: Beaver Dam [without further data; appears to be an old sheet] (U).

University of Wisconsin.

PROPER USE OF THE NAME NYMPHAEA

Kenneth K. Mackenzie

The European white and yellow waterlilies, being the two most conspicuous and handsome water plants in Europe, have naturally always been very favorite objects for illustration and description. Commencing with the earlier botanical printed works and coming down to the present time, we find them both constantly illustrated and described.

Conard (Monograph of the Genus *Nymphaea* 1905) devotes some twenty-three pages to the early history of these plants. His treatment is very far indeed from being exhaustive, but is an aid in arriving at some knowledge of the earlier views concerning these plants.

What one is most impressed by is that practically all early authors treated the two plants together, and that when the idea of a scientific treatment of plants began to prevail, the two plants were almost invariably treated as constituting the one genus *NYMPHAEA*. This treatment was continued by Linnaeus, and prevailed after his time until the early years of the nineteenth century. Then suddenly everyone seems to have become convinced that the two plants belonged to different genera, and everyone since has thoroughly agreed in this view. The remarkable thing is that it took so long to get two such well-marked genera established.

However, one most excellent botanist before the time of Linnaeus had separated the two plants into different genera. I refer to the eminent Dutch botanist Hermann Boerhaave, for whom the genus *Boerhaavia* was named.[1] He, in the year 1720, confined the generic

[1] It may interest American botanists to know that not long ago the twelve volumes of that most celebrated wrok of the Dutch botanists, Rheede van Draakenstein Hortus Indicus Malabaricus, were sent to me by an English book firm widely renowned for its knowledge of literature. These books bear

name *NYMPHAEA* to the yellow water-lilies, and for the white water-lilies established and fully described the genus *Leuconymphaea* (Index alt. Pl. Hort. Acad. Lugd.-Bat. 1: 281). His views were not generally followed, altho they were by Ludwig in 1737.

As is well-known, Boerhaave was a great friend and benefactor of Linnaeus (Jackson, Linnaeus 144–5, 164) and their relations were very close and intimate. Hence Boerhaave's writings and views were of course very well-known indeed to Linnaeus, and when in 1737 Linnaeus issued the first edition of his Genera Plantarum, we find him describing his genus *NYMPHAEA* as follows:

"NYMPHAEA.* *Tournef.* 137. 138. Nelumbo H. P. B. 205. **421.**

CAL: *Perianthium* pentaphyllum, tetraphyllumve, magnum, coloratum, persistens.

COR: *Petala* numerosa (quindecim saepe) calyce minora, germinis lateri insidentia, serie plusquam simplici.

STAM: *Filamenta* numerosa (septuaginta saepe) plana, incurva, brevia. *Antherae* oblongae, filamentorum margini adnatae.

PIST: *Germen* ovatum, magnum. *Stylus* nullus. *Stigma* orbiculatum, planum, peltato, sessile, radiis notatum, margine crenatum, persistens.

PER: *Bacca* ovata, carnosa, rudis, collo angustata, apice coronata, multilocularis (decem ad quindecim-loculis) pulpâ plena.

SEM: plurima, subrotunda.

OBS: Calyx & Corolla *quoad numerum & figuram incerta sunt, hinc.*

Nymphaea *Boerh. calyce pentaphyllo, foliolis subrotundis, petalis minimis.*

Leuconymphaea *Boerh. calyce tetraphyllo, foliolis ovatis, corollam vix superantibus.*

Nelumbo *Tournef. Pericarpii collum minus contractum, & loculamenta nulla.*"[1]

In the 1743 Paris edition treated by Linnaeus as Ed. 3, the reference to *Nelumbo* was changed to read

"Nelumbo *Tournef. Pericarpium turbinatum truncatum, loculis monospermis, propriis foraminibus per discum stigmatis dehiscentibus.*"

In Ed. 5 for "Nymphaea *Boerh,*" "Leuconymphaea *Boerh.*" and "Nelumbo *Tournef.*" Linnaeus substituted[2] "N. lutea," "N. alba"

---

an annotation that they were purchased "at the auction of Dr. Boerhaave's works" and brought to England. The first ten volumes had previously belonged to J. Commelin, the principal author of the work, and several contain his signature. The last two volumes issued after his death have very slightly different binding than the others.

[1] Linnaeus, Gen. Pl. (Ed. 1) 149 1737; Linnaeus, Gen. Pl. (Ed. 2) 225 1742.

[2] Linneaus, Gen. Pl. (Ed. 5) 227 1754.

and "Nelumbo," respectively, leaving the observations under each unchanged.

These I believe comprise all the changes made by Linnaeus before 1764 with the exception of typographical changes.

In Genera Plantarum Ed. 6 p. 264 (1764), however, a very radical change was made and the generic description was changed to read:

"653. NYMPHAEA.* *Tournef.* 137. 138. Nelumbo *Tournef.*
CAL. *Perianthium* inferum, tetraphyllum, magnum, supra coloratum, persistens.
COR. *Petala* numerosa (quindecim saepe), germinis lateri insidentia, serie plus quam simplici.
STAM: *Filamenta* numerosa (septuaginta saepe), plana, curva, obtusa, brevia. *Antherae* oblongae, filamentorum margini adnatae.
PIST: *Germen* ovatum, magnum. *Stylus* nullus. *Stigma* orbiculatum, planum, peltato-sessile, radiis notatum, margine crenatum, persistens.
PER: *Bacca* dura, ovata, carnosa, rudis, collo angustata, apice coronata, multilocularis (decem ad quindecim-loculis), pulpa plena.
SEM: plurima, subrotunda.
N. lutea *Calyce pentaphyllo; foliolis subrotundis, Petalis minimis a reliquis differt.*
Nelumbo *Pericarpium turbinatum, truncatum, loculis monospermis, propriis foraminibus per discum dehiscentibus.*"

It will be seen from the above that when Linnaeus took up the name *Nymphaea* in 1737, he at the same time took up Boerhaave's view that the yellow water lily was typical of the genus and that both the white water lily and *Nelumbo* differed in the particulars indicated. His account of certain parts of the flower in his description of the genus in the first five editions of the Genera Plantarum began with certain phrases applicable only to the yellow water lily. There can be no doubt that during all this time Linnaeus had Boerhaave's views in mind and that the yellow water lily is the type of the genus *Nymphaea*.

In the sixth edition of the Genera Plantarum, as quoted above, Linnaeus changed his generic conception. He changed his description, leaving out parts which referred to the yellow water lily and adding a statement showing that it differed from the other species treated. However, this is self-evidently a different generic conception than the one in the earlier editions, and we must deal with his genus as first established and not as afterwards changed. American botanists have had similar cases to deal with in connection with the changes made by him in his specific descriptions of *Rosa carolina* and *Eupatorium*

purpureum, and have followed his original descriptions and not his changed descriptions.

As stated before, Conard in his Monograph of *Nymphaea*, gave a long history of the early use of the name *Nymphaea*, but the important and fundamental work of Boerhaave was altogether omitted. Later he discussed the use of the name *Nymphaea* (Rhodora **18**: 161–4 1916) and his discussion was supplemented by Fernald (Rhodora **21**: 183–8 1919), but neither of them in any way referred to or considered the facts about *Leuconymphaea* here discussed. This is all the more remarkable because E. L. Greene, whose papers on the subject were referred to by Conard, cites Boerhaave's work (Bull. Torr Club **14**: 179 1887), although he does not refer to its use by Linnaeus. It is very evident that their conclusions, not being based on the facts, cannot be accepted. We must use the name *Nymphaea* for the yellow water lilies, and for the white water lilies must use *Castalia*, the name given to the genus by Salisbury—who first of later day botanists definitely separated the two genera.

Maplewood, New Jersey.

A Teratological Form of Vaccinium pennsylvanicum.—In the course of working over some unmounted material from the herbarium of Dr. George G. Kennedy, there was found a specimen of a very curious form of *Vaccinium pennsylvanicum.* I cannot do better than to quote Dr. Kennedy's manuscript account of it, found with the specimen.

"Abnormal Vacc. Pennsyl. 2 scaly bracted racemes: each with 6 flowers. The urceolate gamopetalous five-toothed corolla of the species is in this a completely five-parted corolla in various stages of separation.

"Six flowers of the twelve have the petals separate completely down to the base of the teeth of the short adnate calyx: these corolla-lobes are flat, linear, acute, with a plainly marked thin translucent edge showing the line of fissure. 2 flowers have a bilabiate corolla, of two, and three united petals: one flower has the corolla-lobes separated, but each division cymbiform instead of flat. One flower has the corolla-lobes tubular or nearly so from the complete involution of the petals. One flower has the petals separate, involute and united at their tips with a curve like the ripe capsule of the peculiar genus

of mosses *Andreaea:* in this little birdcage are seen the anthers and pistil as if on exhibition. One flower has 6 petals, three wholly separate and three united into one; these three united ones show beautifully the translucent edge referred to and have a rosy red blush of color the whole length of the centre of each petal.

"This plant, collected Apr. 26, 1910 at the side of the path up Blue Hill in Milton, [Massachusetts] was a single sprout from a cut off stock with a woody root fitted to sustain a larger branch than the single one bearing these flowers. This branch was 10 inches high with ten young leafy branches, and at the summit the two scaly bracted racemes of flowers.

"The stamens are of normal size about 4 mm. long, but the anthers are empty and somewhat irregular in outline as if shrivelled. 4 and 6 toothed corollas are sometimes found: the 4 appears to have 8 stamens, while the six-toothed has often nine stamens."

The family *Ericaceae* lies on the borderland between polypetalous and gamopetalous orders and in some of its genera, such as *Ledum,* has the petals normally separate. It is, therefore, not surprising that gamopetalous groups in it should occasionally produce teratological forms showing reversion to a polypetalous condition. Such a form occurs even in *Kalmia,* a genus with a very completely united and highly specialized corolla (see Gray, Am. Naturalist iv. 373 and Sargent, Garden & Forest iii. 452). It is noteworthy, however, that in Dr. Kennedy's plant the physiological disturbance is more profound, producing on the same individual, not merely a reversionary separation of the petals, but a, so to say, forward-looking form with irregular, bilabiate corolla.—C. A. WEATHERBY, Gray Herbarium.

HYGROPHORUS CONSTANS OF CENTRAL EUROPE.—Lange in monographing the Danish species of *Hygrophorus* (*sensu latiore*) reached the conclusion that the species figured by Ricken as *H. obrusseus* Fr. was a distinct species, differing from the latter by its conical pileus, more slender stem and much larger spores, and from *H. conicus* (Scop.) Fr. by its broader pileus and its failure to blacken on drying. Hence he named it *Hygrocybe constans.* Kuehner added much morphological and cytological information and described the mature plant in detail. Unfortunately this name was preoccupied by *Hydrocybe constans* Murrill. *Hydrocybe* should be regarded as a variant

spelling of *Hygrocybe*, since Karsten (Bidr. Finlands Natur och Folk **32**: xvii, 233. 1879), who originally raised the section *Hygrocybe* of *Hygrophorus* to generic rank as *Hydrocybe*, corrected the spelling to *Hygrocybe* in his subsequent publications (Acta Soc. pro Fauna et Fl. Fenn. **2**: 14. 1881). Murrill revived the original spelling of Karsten.

Since it is necessary to propose a new name for *Hygrocybe constans* Lange, I take pleasure in dedicating the species to its author as HYGROPHORUS (HYGROCYBE) **Langei**, nom. nov. *Hygrocybe constans* Lange, Dansk Bot. Ark. **4**[4]: 24. 1923; Kuehner, Le Bot. **17**: 54–57. 1926.—Not *Hydrocybe constans* Murrill, Mycologica **4**: 208. 1912 nor *Hygrophorus constans* Murrill, Mycologica **4**: 217. 1912.—*Hygrophorus* (*Hygrocybe*) *obrusseus* Ricken, Die Blätterpilze 21. 1915.—Not *Hygrophorus obrusseus* Fr., Epicrisis 331. 1838, nor *Hygrocybe obrussea* (Fr.) Karst., Bidr. Finlands Natur och Folk **32**: 236. 1879; Acta Soc. pro Fauna Fl. Fenn. **2**: 14. 1881.—CARROLL W. DODGE, Farlow Herbarium.

NYMPHAEA MACULATA RAF.—In the second volume of his Medical Flora (page 45) published in 1830, Rafinesque gave a description of a new species of white water-lily with inodorous flowers as follows:

"2. *Nymphaea maculata* Raf. Leaves orbiculate, subundulate, dentate, base cordate, leaves obtuse, a brown central spot on the leaves, petals white. In Canada and New York, near Lake Ontario. Flowers nearly inodorous, smaller, with many narrow oblong obtuse petals."

The above description undoubtedly refers to the species described by Paine in 1865 (18 Ann. Rep. Regents Univ. N. Y..184) as *Nymphaea tuberosa*, and it is interesting to note that in giving its habitat, he stated (l. c. 185) "in Lake Ontario: filling all marshes beyond the shore for miles northeast of Oswego."

Rafinesque's name, however, cannot be used by those who do not use homonyms, as it is antedated by a year by *Nymphaea maculata* Schum. & Thonn. Beskrivelse af Guineiske Planter in Dansk. Vid. Selsk. **4**: 21 (reprint p. 247). To those, however, who follow the Vienna code, the name is apparently available, as *Nymphaea maculata* Schum. & Thonn. is a synonym of *Nymphaea caerulea* Savigny published in 1802 (Conard, Monograph of *Nymphaea* 141).—K. K. MACKENZIE, Maplewood, New Jersey.

Blewitt's Flora of Waterbury, Connecticut.[1]—The appearance of this work, a well printed and attractively bound volume of 160 pages, is an event of interest to students of the detailed distribution of New England plants. It embodies the results of twenty years' intensive collecting and careful observation on the author's part. Great pains have been taken to insure correctness of determinations, and practically all the records included are based on specimens now in the herbarium of the Connecticut Botanical Society at New Haven or in that of the New England Botanical Club. The work may, then, be accepted as a reliable account of the vascular flora of a typical river-valley in the granitic hill country of southern New England—plus a great variety of introduced plants such as find their way to a manufacturing center like Waterbury. Some of the rarer species occurring in adjoining townships are also included. In all 1394 species, varieties and named forms are listed, with notes as to frequency of occurrence and local habitat and times of flowering and fruiting.—C. A. Weatherby, East Hartford, Connecticut.

[1] Blewitt, A. E. Flora of Waterbury and Vicinity, 1926. Published and for sale by the author, 71 Eastwood Ave., Waterbury, Conn. $2.00.

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ADDITIONS TO THE FLORA OF SPRINGFIELD, MASSACHUSETTS

F. C. Seymour

The flora of Springfield (Massachusetts) is unusually interesting for a combination of reasons. In the first place, it has already been worked over considerably by Mr. Luman Andrews and others, who have given us what they call a "preliminary list."[1] This list is a great encouragement for further work.

Moreover, the flora of Springfield represents an extension of that of the coastal plain, which dwindles rapidly northward from that point in the Connecticut Valley. Several species, like *Scleria reticularis* Michx., are found here, which otherwise stick very closely to the coastal plain.

The Springfield list also includes an interesting variety, from *Psilocarya scirpoides* Torr. to *Pogonia verticillata* (Willd.) Nutt. The habitats are equally diverse, ranging from sandy wastes and pond shores to rich woods and somewhat limy soil. Perhaps such a wide variety is not often met in so small an area, but within the limits of Springfield the sandy plain makes a transition to rich woods, which appear like islands in it, and predominate northward and eastward.

Finally the flora of Springfield is of special interest because the city is growing rapidly. Natural habitats are constantly being obliterated. I am informed that the habitats of some of the rarest species are in imminent danger of becoming the sites of apartment houses.

[1] Catalogue of the Flowering Plants and Ferns of Springfield, Massachusetts, by Luman Andrews and a Committee of the Springfield Botanical Society, Preface, p. 7.

Botanical exploration of this city ought to be pushed with vigor before it is too late. Otherwise in a few years, rare and significant species may become exterminated, never having been discovered there.

Mr. Andrews, who did the greatest part of the work of preparing the published list, expressed the hope that additions would be made subsequently. In September 1925, I spent one day in the region of Water Shop Pond. Last summer (1926), I spent two days exploring the eastern outskirts of the city, because Mrs. Grace P. Johnson, Director of the Springfield Museum of Natural History, informed me that that part of the city was one of those least known botanically. In these trips, I picked up several species which had not previously been collected in the city, and consequently are not listed in the Flora. To list all of the new stations found would make this article too lengthy. But the species new to Springfield, the more important new stations, and a few notes, may be of interest to others.

I wish to acknowledge the kindness of Mr. C. A. Weatherby in advising me and going over many of the determinations.

In the following paragraphs, I have marked all species not included in the list above mentioned with an asterisk, thus *. Species which are reported from a new locality and were known to occur in only one locality when the list was published, I have marked with a dagger, thus †.

This article deals principally with sand plain habitats, ponds, and pond-shores. Dimmock Pond was one of the first ponds visited. Here, unknown to me, Mr. C. A. Weatherby had found *Utricularia geminiscapa* Benj.* (*U. clandestina* Nutt.), in a slough north of the pond on July 23, 1923. That was the first time it had been found in Springfield. Here he had found also *Menyanthes trifoliata* L.† In the "Catalogue," this is recorded as "rare," which means as defined in the Preface that only one station is known.[1] Dimmock Pond is a new station. Well up on the shore in dry sand was another species new to the known flora of Springfield—a *Panicum*, which Mr. Weatherby identifies as *P. sphaerocarpon* Ell.* (No. G353).[2] Close to the water's edge in sand was *Juncus pelocarpus* Mey. (No. G385).†‡ The only station for this recorded in the Catalogue is Red House Crossing Pond.

[1] L. c., p. 6.
[2] The numbers refer to specimens collected by the author.
‡ Specimen in the Herbarium of the Springfield Museum of Natural History.

While riding along the shore of Water Shop Pond, I was attracted to a crater-like depression which contained a bog with a mass of *Ilex* and *Cephalanthus.* There, on top of *Sphagnum,* barely in the water and shaded by the *Cephalanthus* was an abundance of *Utricularia geminiscapa* Benj.,†‡ again (No. 524). Here the plants were fruiting well, enabling me to make a good collection of specimens. Now that it has been found in two localities rather widely separated, perhaps further careful search will reveal it in still more places.

In an attempt to cover a large territory, only a very few minutes were allotted to Loon Pond. But in the turf close to the shore was discovered a little mat of *Eleocharis tenuis* (Willd.) Schultes.*‡ (No. G366). Not far away on the shore, *Juncus pelocarpus* Mey.†‡ appeared again (No. G384). Washed up on the shore were lying some strange-looking basal rosettes of some plant without inflorescences, but with terete leaves. Not suspecting at the time what it was, I gathered a few of these sterile specimens. They subsequently proved to be *Sagittaria teres* Wats.*‡ (No. G345). A species adhering so strictly to the coastal plain was scarcely to be expected in so remote an inland extension. But Professor M. L. Fernald has confirmed the determination. What further interesting discoveries will the pond reveal in the future?

The pond on the North Branch of Mill River is evidently quite new. It is not shown on any map that I have seen. The river has been damned up to form a pond for an angler's club. Aquatic species seem scarcely to have gotten a start as yet. But *Juncus pelocarpus* Mey.†‡ is there already (No. G386). *Cornus Amomum* Mill.,* which has not previously been known to Springfield, was growing near the shore. (No. G442). Likewise, *Vaccinium corymbosum* L.,*‡ new to Springfield, was growing here (No. G447). On a bank above the pond was a fine growth of *Lycopodium clavatum* L., var. *megastachyon* Fernald & Bissell* (No. 616).

At this pond, and at the South Branch of Mill River (as will be noted below), there are signs of the soil undergoing a transition from the acidity of the sand plain to a sweet soil such as is very marked in the town of Wilbraham, next to the eastward from Springfield. The tributaries of both branches of Mill River rise, for the most part, in the Wilbraham Mountains, which accounts for the quality of the soil along their courses. Here, on the North Branch, the alkaline tendency was evidenced by the presence of such species as *Pedi-*

cularis lanceolata Michx. and *Solidago patula* Muhl.* (No. 583). The latter was thriving in good quantity in a meadow close by.

Along Parker Street, close to the road, I came upon one sickly clump of *Juniperus communis* L., var. *depressa* Pursh*† (No. G332). As this land is being boomed for house lots, probably this species will soon be exterminated there,—the only place it is known to grow in the City.

In the angle formed by the junction of Parker Street and Wilbraham Road, there is an outcrop of red sandstone. The soil is very reddish. Here in an open field were vast quantities of *Juncus secundus* Beauv.* (No. 587).

Another outcrop of red sandstone appears on the shore of Venturer's Pond. *Juncus pelocarpus* Mey.† was growing in the sand here near the water's edge. (No. 461). On the west side, the pond is somewhat muddy. In the mud, *Brasenia Schreberi* Gmel.† was growing and fruiting abundantly, in water that was scarcely a foot deep (No. 469).

Almost between Venturer's and Bass Ponds, along Plumtree Road, a very few plants of *Sericocarpus linifolius* (L.) BSP.† appeared. (No. 548). This is another station in Springfield for a coastal plain species listed as "rare."

Bass Pond is lined along the east shore by all sizes of fragments of reddish rock and a steep bank. In this habitat, grew *Thelypteris marginalis* (L.) Nieuwl.‡ (No. G329). (*Aspidium marginale* (L.) Sw.) For a long time, it has been known that this species grew or had grown in Springfield, but the locality was no longer known.[1] In the sand on another part of the shore was the omnipresent *Juncus pelocarpus* Mey.†‡ (No. G383). In the thicket which lined the shore marking the high water line, were again *Vaccinium corymbosum* L.*‡ (No. G448) and *Cornus Amomum* Mill.*‡ (No. G440).

The most productive locality which I visited was the Mill Pond of the South Branch of Mill River. For the third time, I collected *Cornus Amomum* Mill (No. G441)*‡. From a row boat, I reached a dense growth of *Sparganium americanum* Nutt.†‡ (Nos. G333, G334). Associated with it, in deep muck, was a growth of *Potentilla palustris* (L.) Scop.†‡ (No. G324). This species was found on the shore of Water Shop Pond in 1878, but no one knows just where.[2] The Mill

[1] Catalogue, p. 15.
[2] Catalogue, p. 109.

Pond is a new locality, and the only one known exactly. The habitat on Water Shop Pond may have been destroyed, or for other reasons, it may not now grow there. Springfield seems to be the only known station for this species in the Connecticut Valley in Massachusetts.

This Pond yielded also *Potamogeton natans* L. (No. G341)*‡ and *Ceratophyllum demersum* L.*‡ (No. G414). In the deeper water (about 5 feet) were discovered several clumps of *Potamogeton obtusifolius* Mertens & Koch*‡ (No. G342). Only one specimen could be found with fruit, but Prof. Fernald has examined it and confirmed the determination. This species is further evidence of a transition in the constitution of the soil in the eastern part of Springfield from acid to alkaline.

It will be noted from the above that *Juncus pelocarpus* Mey., a typical species of the coastal plain, reported in the "Catalogue" from only one locality, occurs again and again. The only ponds which the author visited where he failed to find this plant were Water Shop Pond and the Mill Pond of South Branch. Probably it occurs there also. Red House Crossing Pond was the one locality previously known. The author found it at the following: Venturer's, North Branch, Dimmock, Loon, and Bass Ponds.

Other collectors have made a number of additions to the flora of Springfield, since the publication of the Catalogue. With the permission of Mrs. Johnson, who has kindly given me the data, I publish herewith those additions.

The following were collected by Dr. Walter H. Chapin:

Polypodium vulgare L., Mill Dam, Sixteen Acres.

Thelypteris Phegopteris (L.) Slosson,* (*Phegopteris polypodioides* Fée), near McKnight Glen beside New England R. R.

Allium vineale L.,* Alexander Lot, corner State and Elliott Streets.

Carya alba (L.) K. Koch, edge of woods near Rimmon Avenue.

Carya ovalis (Wang.) Sargent (*C. microcarpa* Nutt. of Gray's Manual, ed. 7), var. *odorata* Sargent,* Oak Grove Cemetery.

Betula lutea Michx.,* edge of woods near Rimmon Avenue.

Acer platanoides L.,* Locust Street Extension.

Convolvulus arvensis L.,* waste land, Albany Street.

Orobanche uniflora L.,* near Old Mill Dam, South Branch.

Lonicera Morrowi Gray,* Locust Street Extension.

Reseda alba L.* was collected by Mrs. Grace P. Johnson, west of the Museum of Natural History.

Pogonia verticillata (Willd.) Nutt. was collected in Springfield Cemetery, in 1847, by Mr. Charles Goodrich.

Viola sagittata Ait., var. *ovata* (Nutt.) T. & G. (*V. fimbriatula* Smith) was collected in 1868 in Springfield Cemetery by the same collector.

Mr. C. A. Weatherby has made the following addition beside those mentioned above.

Rubus allegheniensis Porter,* dry woods near Dimmock Pond.

In all this article lists 24 species or varieties not previously reported in Springfield; and one or more new localities for 7 species, previously known from only one station in Springfield.

North Amherst, Massachusetts.

CONCERNING DILEPYRUM

Kenneth K. Mackenzie

In an article in Rhodora (**29**: 158) Mrs. Chase takes exception to Mr. Farwell's use of *Dilepyrum* for *Brachyelytrum*. We are informed by her that Michaux's first species (*D. aristosum*) is a mystery which "has not been identified." However, it may be pointed out that its habitat is given by Michaux as "in umbrosis sylvis Georgiae et Carolinae" and his description commences "D. universe pubens." His description applies to the grass appearing in our manuals as *Brachyelytrum erectum* (Schreb.) Beauv., and I am sure that Mrs. Chase cannot produce from the very large grass collection at Washington any other species of grass from Georgia or Carolina, to which the description does apply. Fortunately, for our purposes, grasses with one-flowered spikelets "universe pubens" are very few in number in our flora.

Brachyelytrum is a grass which I have rather disliked to collect, because the spikelets have a habit of breaking up when the material is at all mature. When this breaking up takes place, the two glumes remain attached to the pedicel and the rest of the spikelet breaks off. This is the condition in which one gets this grass very frequently. It is especially evident when one deals with unmounted herbarium material. Then many specimens will show numerous broken-off spikelets and the very natural thing to do is to study these. Assuming that Michaux had the species in this condition, it is easy to see that he (or Richard) made up his description from the lemma and palet of

the broken-off spikelet, and overlooked the two glumes remaining attached to the pedicel. His description does very well describe such part of the spikelet, and all of Mrs. Chase's troubles will disappear should she so apply it.

In his generic description of *Dilepyrum*, Michaux describes the valves (i. e. lemma and palet) as "subulato-linearibus, carinatis." This applies to his first species *D. aristosum*, but one would hesitate to apply it to his second species, which has been identified as *Muhlenbergia Schreberi*. The first species should therefore be regarded as the type of the genus *Dilepyrum*.

It seems to me that Mrs. Chase's kind attempt "to correct Mr. Farwell's misconception" is a case of misapplied helpfulness, and that Mr. Farwell is entitled to the credit of a good piece of investigation.

Maplewood, New Jersey.

SIXTH REPORT OF THE COMMITTEE ON FLORAL AREAS

It is the present intention of the committee to prepare preliminary lists of all families of New England plants of which such lists have not previously been made and to accompany them, as heretofore, with geographic notes. In pursuance of this plan, the families between *Pinaceae* and *Gramineae* in the Manual order are here treated, with the exception of *Sparganiaceae, Najadaceae*, and *Juncaginaceae*, lists of which by Prof. Fernald have already been published (Rhodora ix. 86; x. 168).

To these previous lists the committee has one addendum. Bennett's *Plants of Rhode Island* records *Triglochin palustris* from Newport. Bennett's work was not very critical and many errors crept into it; his record might therefore be disregarded except for the fact that there is in the Tweedy herbarium at Yale University a specimen of *T. palustris* labelled "Newport, R. I., salt marsh. Legit F. Tweedy, July, 1877." The species is not otherwise known on the Atlantic coast south of York Co., Maine, and neither the committee nor Mr. S. N. F. Sanford, who has utilized his special knowledge of the local flora and of local botanical effort in the past in running down every possible clue, has been able to discover any further evidence of its occurrence in Rhode Island. Nevertheless, there

seems to be no reason to doubt the authenticity of Tweedy's label; the Newport station, now very likely extinct, may be regarded as a southern outpost of the species, comparable to the detached outlying stations of *Puccinellia paupercula*, var. *alaskana* in Massachusetts and Connecticut.

The committee is under constant obligation to individuals and institutions for information and the privilege of examining specimens. Space hardly permits detailed acknowledgement; but to all who have aided us our hearty thanks are extended.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS—XXXI.

The sign + indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.

	Maine	N. H.	Vt.	Mass.	R. I.	Conn.
Typhaceae						
Typha angustifolia L.	+	+	+	+	+	+
Typha latifolia L.	+	+	+	+	+	+
Typha latifolia L. f. ambigua (Sonder) Holmb.	+	+	+	+		
Alismaceae						
Alisma Plantago-aquatica L.	+	+	+	+		
Alisma Plantago-aquatica L. var. parviflorum (Pursh) Farwell	+	+	+	+	+	+
Echinodorus tenellus (Mart.) Buchenau				+		
Lophotocarpus calycinus (Engelm.) J. G. Sm., var. spongiosus (Engelm.) Fassett	+	+		+		+
Sagittaria cuneata Sheld.	+	+	+	+		+
Sagittaria Engelmanniana J. G. Sm.				+	+	+
Sagittaria graminea Michx.	+	+	+	+	+	+
Sagittaria heterophylla Pursh			+	+		+
Sagittaria heterophylla Pursh f. elliptica (Engelm.) Blake				+		
Sagittaria heterophylla Pursh f. fluitans (Engelm.) Blake			+	—		
Sagittaria heterophylla Pursh f. rigida (Pursh) Blake	+	+	+	+	—	+
Sagittaria latifolia Willd.	+	+	+	+	+	+
Sagittaria latifolia Willd. f. diversifolia (Engelm.) Robinson	+	+		+		+
Sagittaria latifolia Willd. f. gracilis (Pursh) Robinson	+	+	+	+	+	+
Sagittaria latifolia Willd. f. hastata (Pursh) Robinson	+	+	+	+	+	+
Sagittaria latifolia Willd. f. obtusa (Muhl.) Robinson	+	+	—	+	+	+
Sagittaria subulata (L.) Buchenau						+
Sagittaria subulata (L.) Buchenau var. gracillima (Wats.) J. G. Sm.				+	+	+
Sagittaria teres Wats.				+		

HYDROCHARITACEAE						
Elodea canadensis Michx.	−		+	+		+
Elodea Nuttallii (Planch.) St. John						+
Elodea occidentalis (Pursh) St. John	+		+	+	−	+
Elodea Planchonii Caspary				+		
Vallisneria americana Michx.	+		+	+	+	+

Sagittaria longirostra (Micheli) J. G. Sm. has been reported from Groton, Conn. (Gray's Man. ed. 7; Bull. Conn. State Geol. & Nat. Hist. Survey xiv. 45 (1910)). Mr. Bayard Long, however, who has made an intensive study of the group, regards the specimens on which these reports were based as representing only a broad-leaved form of *S. Engelmanniana*. *S. longirostra* is accordingly omitted here.

Typha latifolia, f. *ambigua* is a form in which all the technical characters of *T. latifolia*—ebracteolate pistillate flowers, flattened and dilated stigmas, etc.—are present, but the staminate and pistillate parts of the spike are separated and the whole plant is often more slender than is usual in the species. In these respects it simulates *T. angustifolia* and reports of that species from inland localities in non-calcareous regions have no doubt sometimes been based on specimens of it. Such reports should be regarded with suspicion unless substantiated by specimens.

Information in regard to other names used in the above list, but not in the 7th edition of Gray's Manual, may be found in the following papers: Blake, RHODORA, xv. 158 (*Sagittaria heterophylla*); Fernald, RHODORA xx. 108 (*Vallisneria*); St. John, RHODORA xxii. 17 (*Elodea*); Britton & Brown, Ill. Flora, ed. 2, i. 99 (*Sagittaria cuneata*); Fassett, RHODORA xxiv. 71 (*Lophotocarpus*); Wiegand & Eames, Mem. Cornell Univ. Agric. Exp. Sta. xcii. 53 (*Alisma*).

The groups here treated are composed wholly of aquatic or marsh species. This may partly account for the rather interrupted and eccentric distribution of some of them (if anything can be called eccentric in a matter so endlessly various as the ranges of plants) and the consequent comparatively large proportion which we have had to place in the miscellaneous section. As heretofore, forms which appear to have no significant ranges are not recognized in the geographic treatment, but are there included under the species with which they belong. Thus, the ranges of the forms of *Sagittaria latifolia* nearly coincide and are handled as a unit.

Generally Distributed.—*Typha latifolia; Sagittaria graminea, S. latifolia.*

Northern.—*Sagittaria cuneata.*

S. cuneata occurs in southern New England only at a few stations in the Housatonic Valley in western Massachusetts and northwestern Connecticut, and along the Connecticut River in the north central part of the latter state. It is conspicuously absent from the whole area south of the White Mountains and east of the Connecticut Valley, and except for a single station in Washington Co., from the coastal portion of Maine. Its range suggests a calcicolous habit; but there are enough stations in localities of generally acid soils to make it seem, for the present, better placed in this group.

Southeastern Massachusetts and rather general elsewhere but not in northern Maine.—*Vallisneria americana.*

This species has a single station on the outlet of Sourdnahunk Lake, Maine, at about the 46th parallel; it is not known from Washington Co., and we have seen no specimens from New Hampshire. It seems hardly possible, however, that it can occur all around that state, as it does, and not within it.

Chiefly the Three Southern States.—*Sagittaria subulata*, var. *gracillima; Alisma Plantago-aquatica*, var. *parviflorum.*

Sagittaria subulata, var. *gracillima* is endemic in New England, being known only from eastern Massachusetts, a single station in Rhode Island, and two in north central Connecticut.

Alisma Plantago-aquatica, var. *parviflorum*, common in most parts of the three southern states, is known to us northward only from the Winooski valley, the Connecticut valley near the confluences of the White and Ammonoosuc Rivers, and near the coast as far east as the Kennebec valley, with a single outlying station in the Penobscot valley. It is apparently rare in southeastern Massachusetts. Indeed, we have seen no specimens from that region; but there are reports of "Alisma Plantago" from near New Bedford by Hervey and from Nantucket by Bicknell, which in all probability refer to this variety.

Coastal Plain.—*Sagittaria Engelmanniana, S. teres.*

S. teres is known in New England only from Barnstable and Plymouth counties, from a single station in Middlesex Co., Mas-

sachusetts, and from near Springfield, where it has recently been discovered by Rev. F. C. Seymour. *S. Engelmanniana* occurs, more frequently, in the same general regions and also about sand-plain ponds in Rhode Island and eastern Connecticut.

CALCICOLOUS.—*Elodea canadensis.*

Except for two stations in northeastern Massachusetts—a region where other calcicolous species, for instance *Amelanchier spicata*, have been found—and one in a calcareous area near Rockland, Maine (C. A. E. Long, RHODORA xxiv. 181), this species is known only west of the Connecticut River.

MARITIME.—*Typha angustifolia; Lophotocarpus calycinus,* var. *spongiosus; Sagittaria subulata.*

Although alike in being restricted wholly or mostly to the vicinity of the coast and in their generally southern ranges, the species here placed differ considerably in habitat and in the portions of the coast which they occupy. *Typha angustifolia* is a plant of brackish marshes or occasionally of alkaline situations inland; *Lophotocarpus* inhabits the tidal mud of estuaries; *Sagittaria subulata* is a denizen of muddy, but apparently not necessarily brackish, shores. It penetrates New England from the south only as far as the mouth of the Connecticut River. *Typha angustifolia* is uniformly distributed along the coast, reaching its extreme northern limit there at the estuary of the Penobscot. It is found inland in the Connecticut Valley in north central Connecticut, in the Housatonic Valley in Connecticut and Massachusetts, and at at least two stations in the Champlain Valley. It is even said to be occasional in marshes in Vermont (Vt. Agr. Exp. Sta. Bull. clxxxvii. 162 (1915)), but this statement is not borne out by the specimens and detailed records at hand. Probably, as suggested above, it is based in part on collections of *T. latifolia*, f. *ambigua.* The reports of *T. angustifolia* from Belchertown and Sandisfield, Mass. (Stone, Plants of Franklin, Hampshire, and Hampden Cos., Mass. 6 (1913); Hoffmann, Proc. Boston Soc. Nat. Hist. xxxvi. 204 (1922)) may perhaps be similarly explained.

Lophotocarpus calycinus, var. *spongiosus*, no doubt because of its preference for estuarine mud, has a broken distribution. It occurs on the estuary of the Kennebec and on certain creeks between it and the Penobscot; near the mouths of the Saco, Piscataqua, and Merri-

mac Rivers; about Massachusetts Bay; in the estuary of the Connecticut River; and at various stations from New Haven westward.

MISCELLANEOUS.—*Sagittaria heterophylla; Echinodorus tenellus; Elodea Nuttallii, E. occidentalis, E. Planchonii; Alisma Plantago-aquatica.*

Sagittaria heterophylla has a curiously disrupted range in New England. It occurs, in one form or another, on Nantucket; in the Connecticut and Housatonic Valleys in Connecticut; in the Housatonic and Merrimac Valleys in Massachusetts; at Manchester, N. H.; in the estuary of the Kennebec; at a single station near Hanover, N. H.; and at numerous stations in the Champlain Valley. It is reported also from the Connecticut Valley in Massachusetts (Stone, without locality) and from Norwich, Conn.

Of the leaf-forms, f. *rigida* is the commonest and apparently the normal form of the species. The typical form with auricled leaves occurs here and there; f. *elliptica,* so far as specimens seen show, only at Lowell, Mass. Both are luxuriant phases. *F. fluitans,* an adaptation to deeper water, occurs at several stations along Lake Champlain and, according to Hoffmann, in Berkshire Co., Mass.

Elodea occidentalis is frequent in Connecticut, and is known from northern Rhode Island, from Cape Cod, Plymouth, the region of Massachusetts Bay, and the Merrimac Valley in eastern Massachusetts, from the lower Androscoggin and Kennebec Valleys and Rangeley Lakes, Maine, and from Windsor, Vermont. The very problematical *E. Nuttallii* is known in our region only from Oxford, Conn.; *E. Planchonii* only from Wakefield and East Andover, Mass. Wiegand and Eames (Cornell Univ. Agr. Exp. Sta. Mem. xcii. 55) believe that this last is only the staminate plant of *E. canadensis.*

The reports of "*E. canadensis*" in Jackson's Flora of Worcester Co., Mass., and in Stone's Plants of Franklin, Hampshire, and Hampden Cos. probably refer to *E. occidentalis.* Reports in the older floras are, of course, non-committal as to which species was actually in hand. But the absence of any reference to *Elodea* in such floras as Hervey's of New Bedford, Pease's of Coös Co., New Hampshire, Hill's of the Penobscot Bay region and Rand and Redfield's of Mt. Desert, Maine, and Bicknell's of Nantucket is surely significant, and indicates that the distribution of *E. canadensis* and *E. occidentalis* as above given is essentially correct.

Echinodorus tenellus is known in our area only from Winchester and Cambridge, Mass.

Alisma Plantago-aquatica, so far as known to us, occurs in Maine south, or only a little north of the 45th parallel of latitude, in New Hampshire, Vermont and northeastern Massachusetts, but not elsewhere in our area.

C. A. Weatherby
C. H. Knowlton
R. C. Bean

Stipa spartea found in Pennsylvania.—On July 9, 1927, the writer found a small colony of *Stipa spartea* Trin. growing on a bank along the highway called the Lackawanna Trail, a short distance north of Dalton, Lackawanna County, Pennsylvania. The colony consisted of, perhaps, twelve or fifteen well developed and very robust tufts. The culms were from three to four feet tall and bore mature seeds. From all appearances this grass has been on that spot for several years and has become well established.

The Lackawanna trail in that region follows the old road-bed of the D. L. & W. railroad and, no doubt, the seeds of this plant have dropped from a passing freight train.

We were indeed very much astonished and thrilled to find this prairie species of grass in the State of Pennsylvania, from which, so far as we know, it has never before been reported.—E. M. Gress, State Botanist, Harrisburg, Penna.

A Plant new to Mt. Desert.—To the list of plants known from Mt. Desert Island may be added *Bidens frondosa* L., var. *anomala* Porter, which was collected by the writer at Bar Harbor, Maine, on August 5, 1927. It grew in the habitat usually preferred by this variety, on a cobblestone beach, a short distance above high tide level. The plant is rather common not a quarter of a mile from the steamboat landing, just below the sea-wall followed by the "Shore Walk."—N. C. Fassett, Madison, Wisconsin.

Vol. 29, no. 347, including pages 225 to 240, was issued 21 November, 1927.

ERRATA

Page 10, last line, *for* xxiii *read* xxii.
" 15, line 1, for Trillum read Trillium
" 84, " 17, *for* sugbenus *read* subgenus
" 86, " 33, for Magdelen read Magdalen
" 87, in page heading, *for* Svensom *read* Svenson
" 106, line 15, for *Heliotropum* read *Heliotropium*
" 109, " 25, *for* Bob *read* Bog
" 117, last line, *for* 1886 *read* 1866
" 122, line 26, for *glabruiscula* read *glabriuscula*
" 128, " 30, *for* costal *read* coastal
" 128, " 34, for *Eriophorium* read *Eriophorum*
" 129, " 17, *for* on *read* of
" 131, " 30, for *cinnanomea* read *cinnamomea*
" 132, " 6, for *Arctostaphyllos* read *Arctostaphylos*
" 161, " 29, for *Artemisa* read *Artemisia*
" 177, " 15, for *melancarpa* read *melanocarpa*
" 185, " 21, for *americanum* read *americanus* and *for* Sims. *read* Sims
" 188, " 8 from bottom, for *Lonicrea* read *Lonicera*
" 190, " 9 from bottom, for *alpinum* read *alpinus*
" 199, " 22, *for* Green *read* Greene
" 205, " 7, *for* Presl., *read* Presl,
" 230, " 10, for Englemanni read Engelmanni
" 231, " 7 from bottom, for Amelachier read Amelanchier

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